

(2) AVIATION MACHINIST'S MATE, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) WORKING DRAWINGS.—Demonstrate ability to interpret aircraft assembly and installation drawings.
- (b) PRECISION INSTRUMENTS.—Demonstrate the correct use of common precision instruments including inside and outside micrometers and surface gages.
- (c) AIRCRAFT CONTROLS.—Demonstrate ability to inspect and service aircraft control systems.
- (d) HYDRAULICS.—Demonstrate proper methods of servicing and inspecting aircraft hydraulic systems.
- (e) INSPECTION.—Demonstrate ability to make daily inspections and thirty-hour and sixty-hour checks on service aircraft and engines.
- (f) PROPELLER MAINTENANCE.—Demonstrate ability to inspect, remove, install, and check track of propellers.
- (g) ENGINE TESTS.—Demonstrate ability to make operational tests and to correct simple engine malfunctions.
- (h) IGNITION AND VALVES.—Demonstrate proper methods of adjusting valve clearance and checking magneto timing.
- (i) INSTRUMENTS.—Demonstrate the proper removal, check, and reinstallation of all mechanical, electrical, and vacuum instruments and accessories used on service aircraft. Be able to locate, remove, and replace defective bulbs and fuses.
- (j) BRAKES.—Demonstrate ability to service and adjust brakes.
- (k) D-5208.02 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) STRUCTURES.—Have a working knowledge of aircraft structures.
- (b) ENGINES.—Be thoroughly familiar with the construction and operation of service aircraft engines.
- (c) FUEL SYSTEMS.—Have a working knowledge of the service types of fuel systems.
- (d) ACCESSORIES.—Be thoroughly familiar with the operation and adjustment of engine accessories.
- (e) INSTRUMENTS.—Understand the principle and function of all mechanical, electrical, and vacuum instruments.
- (f) IGNITION.—Have an understanding of the construction and the operating principles of aircraft magnetos and aircraft ignition systems.
- (g) REPORTS.—Be familiar with inspection and operational reports, and sources of technical information.
- (h) D-5208.02 (1) (B).

(3) AVIATION MACHINIST'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) ASSEMBLIES.—Demonstrate ability to assemble, align, and rig aircraft and their component parts.
- (b) ENGINE MAINTENANCE.—Demonstrate ability to maintain, operate, and adjust aircraft engines.
- (c) ACCESSORIES.—Demonstrate ability to make adjustments to all accessories.
- (d) TROUBLE SHOOTING.—Demonstrate ability to recognize and correct power plant malfunctions; must also be able to correct minor structural discrepancies indicated by flight reports.
- (e) D-5208.02 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) **AIRCRAFT.**—Have a thorough knowledge of the construction and performance of service aircraft.
- (b) **ENGINES.**—Have a thorough knowledge of the principles and construction of aircraft engines, including the use of power curves.
- (c) **D-5208.02 (2) (B).**

(4) AVIATION CHIEF MACHINIST'S MATE.**(A) PRACTICAL FACTORS.**

- (a) **ORGANIZATION.**—Demonstrate ability to organize and put an aircraft squadron or repair unit in operation.
- (b) **ENGINEERING DEPARTMENT.**—Demonstrate ability to take charge of the Engineering Department of an aircraft squadron or unit.
- (c) **OVERHAUL.**—Demonstrate ability to supervise the overhaul of all aircraft engines and accessories; must be able to conduct the final flight inspection of aircraft.
- (d) **STATION ASSIGNMENTS.**—Demonstrate ability to draw up a watch, quarter, and station bill for an aircraft squadron or unit.
- (e) **BATTLE BILL.**—Demonstrate ability to set a watch for battle conditions.
- (f) **C.P.O. DUTIES.**—Demonstrate ability to carry out the duties of a leading chief petty officer (personnel, operations).
- (g) **D-5208.02 (3) (A).**

(B) EXAMINATION SUBJECTS.

- (a) **NAVAL ORGANIZATION.**—Have a detailed knowledge of the naval aviation organization including all phases of squadron activity.
- (b) **AVIATION RATINGS.**—Be thoroughly familiar with the duties of all aviation ratings.
- (c) **WATCH DUTIES.**—Know the duties of a junior watch officer.
- (d) **PERSONNEL DUTIES.**—Have a general knowledge of the duties of an assistant personnel officer.
- (e) **TECHNICAL INFORMATION.**—Know where to find and how to use technical information regarding airplanes and engines.
- (f) **MATERIEL.**—Know where and how to obtain materiel and spare parts.
- (g) **REPORTS.**—Know how to make periodic reports of inspections of engines and airplanes, as required by the Bureau of Aeronautics.
- (h) **D-5208.02 (3) (B).**

D-5208.021. Aviation Machinist's Mates C— (Aviation Carburetor Mechanics).

For tentative qualifications see Bureau of Naval Personnel Circular Letter No. 280-43 and any amendments thereto.

D-5208.022. Aviation Machinist's Mates F— (Aviation Flight Engineers).**(1) AVIATION MACHINIST'S MATE F, THIRD CLASS.****(A) PRACTICAL FACTORS.**

- (a) **D-5208.02 (1) (A).** (All items).

(B) EXAMINATION SUBJECTS.

- (a) **D-5208.02 (1) (B).** (All items).

(C) SCHOOL QUALIFICATIONS.

- (a) **D-5208.02 (1) (C).**
- (b) Graduation from Naval Training School for Flight Mechanics, or have demonstrated the possession of equivalent qualifications.

(2) AVIATION MACHINIST'S MATE F, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) PRE-FLIGHT AND TAKE-OFF.—Demonstrate ability to follow proper engineering procedure and take necessary actions in inspection, testing, and operation of engines, controls, and equipment on own planes before flight and in taxiing, take-off, and climb. Demonstrate ability to set controls for fuel system, mixture control, carburetor air, supercharger, oil system, generator, auxiliary power plant, electric power circuits, and cowl flaps in accordance with procedure prescribed by squadron to which attached.
- (b) CRUISING AND LANDING.—Demonstrate ability to use power charts for engines used in planes of squadron to which attached. Demonstrate ability to construct and use simple "Howgoesit" curves. Demonstrate ability to recognize specific signs of malfunctioning of engines from observations of instruments and when possible to make adjustments in flight. Demonstrate ability to follow prescribed squadron engineering procedure and take necessary actions in descent, landing, and stopping.
- (c) ENGINE TESTS.—Demonstrate ability to make all operational tests and to make normal corrections to eliminate engine malfunctions. Demonstrate ability to make daily inspections and all periodic checks on service aircraft, engines, carburetors, and auxiliary power plants. Demonstrate proper methods of adjusting valve clearance, timing magnetos, and making compression checks.
- (d) FUEL AND OIL SYSTEMS.—Demonstrate working knowledge of typical fuel and oil systems, including familiarity with fueling and defueling of complex systems and precautions to be observed. Show thorough understanding of methods of controlling and measuring fuel flow to engines. Show ability to trace, maintain, and make normal repairs to fuel and oil systems in planes of squadrons to which attached.
- (e) INSTRUMENTS AND ACCESSORIES.—Demonstrate the proper removal, check, and reinstallation of all mechanical, electrical, and vacuum instruments and accessories used on own aircraft. Be able to locate malfunctioning and make simple repairs and adjustments.
- (f) PROPELLER MAINTENANCE.—Demonstrate ability to inspect, remove, install, and check track of propellers. Be able to inspect, remove, and install propeller governors and synchronizers used on own aircraft.
- (g) AIRCRAFT CONTROLS.—Demonstrate ability to inspect and maintain aircraft control systems. Be able to inspect flaps, aileron, bomb bay door, elevator, rudder, trim tab control, and engine control linkage for freedom of action, corrosion, wear, and proper rigging. Be able to make readjustments, repairs, and replacements and to take proper measures for prevention of corrosion.
- (h) HYDRAULICS.—Demonstrate proper methods for inspecting, adjusting, and maintaining hydraulic systems, brakes, and beaching gear if used on own planes.
- (i) WORKING DRAWINGS.—Demonstrate ability to interpret aircraft assembly and installation drawings and wiring diagrams relating to all parts and equipment on own plane.
- (j) PRECISION INSTRUMENTS.—Demonstrate correct use of common precision instruments including inside and outside micrometers and surface gages.
- (k) SURFACE REPAIRS.—Demonstrate ability to make inspections and emergency repairs of cowlings, nacelles, hull, floats, and other parts of plane's skin structure, including fabric surfaces.
- (l) BEACHING AND LAUNCHING.—Demonstrate ability to direct a crew in handling seaplanes on water, in beaching, and launching. Be able to di-

rect crew in mooring to a buoy, anchoring, emergency securing, and securing overnight on water. Demonstrate thorough familiarity with small tackle and lines as used on seaplanes.

- (m) **OXYGEN AND EMERGENCY EQUIPMENT.**—Demonstrate ability to inspect, adjust, and operate oxygen equipment if used on own aircraft. Be able to locate, operate, and inspect all emergency equipment carried including life rafts, rations, pyrotechnics, water still, and emergency radio transmitter.
- (n) **REPORTS.**—Demonstrate ability to make inspectional and operational reports. Demonstrate ability to keep aircraft, engine, and accessory logs. Know sources of technical information relating to aircraft, engines, and accessories.
- (o) **AERIAL MACHINE GUNNERY.**—If assigned to a combat type squadron or unit, must demonstrate ability to function efficiently as an aerial machine gunner. (Marked inefficiency in aerial machine gunnery and definite incapability to withstand air sickness and high altitude conditions may be considered disqualifying.) Demonstrate ability to assemble and disassemble the type of machine gun used in aircraft to which attached.
- (p) D-5208.02 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) **MATHEMATICS.**—Have a working knowledge of charts and graphs, ratios, powers, and roots.
- (b) **HYDRAULICS.**—Have a working knowledge of hydraulic principles, including the theory of pressure transmission, pumps, valves, and hydraulic units.
- (c) **MECHANICS.**—Have an elementary knowledge of the principles of mechanics relating to mass, gravity, force, moments, velocity, and work.
- (d) **ELECTRICITY.**—Have a working knowledge of the basic principles of electricity, including Ohm's law, power, alternating currents, filters, electromagnetism, and methods of measurements.
- (e) **ENGINE PRINCIPLES.**—Be thoroughly familiar with the principles of operation of engines used in the squadron to which attached including the factors affecting power and fuel consumption, power at various altitudes, temperature control, R.P.M. control, and carburetion. Know the specific limitations for cylinder head temperature, oil temperature, oil pressure, fuel pressure, manifold pressure and propeller pitch during warm-up, take-off, and various stages of flight.
- (f) **STRUCTURES AND EQUIPMENT.**—Have a working knowledge of the construction and operation of all structures and equipment on own planes, including such features as general construction, bilges, compartmentation, controls, instruments, hydraulic systems, electric equipment and circuits, fuel systems, carburetors, propellers, accessories, anti-icing equipment, and auxiliary power plant.
- (g) **AERODYNAMICS.**—Have a working knowledge of the theory of flight.
- (h) **CRUISING CONTROL.**—Understand thoroughly the cruising control techniques used by the squadron to which attached.
- (i) **LOADING CONTROL.**—Have a basic knowledge of loading control on own planes including the weight-balance factors involved, corrections to be made in air, variations in long flights, and use of loading control computers and charts.
- (j) **EMERGENCIES.**—Know procedures and methods to be used in event of emergencies during flight such as engine failure or damage, fire, and icing. Know the procedure for shutting down engines in flight and for flight operation on one or two engines. Be familiar with the abandon ship bill for own planes.
- (k) D-5208.02 (1) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Graduation from Naval Training School for Flight Mechanics or possession of the equivalent in experience.

(D) FLIGHT DUTY.

- (a) At least 100 hours of flight duty in training in duties of an aviation flight engineer.

(3) AVIATION MACHINIST'S MATE F, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) ASSEMBLIES.—Demonstrate ability to assemble, align, and rig aircraft and their component parts.
- (b) ENGINE REPAIR.—Demonstrate ability to make all minor repairs to aircraft engines and auxiliary power plants of squadron or unit to which attached.
- (c) TROUBLE SHOOTING.—Demonstrate high degree of ability to recognize and correct all malfunctions of power plant, auxiliary power plant controls, and accessories. Be able to correct minor structural defects.
- (d) ELECTRICAL EQUIPMENT.—Demonstrate ability to operate, adjust, test, locate malfunctions of, and make minor repairs to electrical equipment and circuits on own plane.
- (e) CRUISING CONTROL.—Demonstrate high degree of ability to use all cruising control techniques for type of plane to which assigned.
- (f) LOADING CONTROL.—Demonstrate ability to use proper loading control methods for type of plane to which assigned.
- (g) D-5208.022 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) AIRCRAFT.—Have a thorough knowledge of the construction and performance of service aircraft.
- (b) ENGINES.—Have a thorough knowledge of the construction and principles of operation of aircraft engines.
- (c) FUELS AND OILS.—Have a working knowledge of aircraft engine fuels and lubricating oils.
- (d) METALS.—Have a working knowledge of characteristics and uses of aviation metals.
- (e) AERODYNAMICS.—Have a thorough knowledge of the theory of flight.
- (f) D-5208.022 (2) (B).

(C) FLIGHT DUTY.

- (a) At least 300 hours of flight, performing duties of an aviation flight engineer.

(4) AVIATION CHIEF MACHINIST'S MATE F.

(A) PRACTICAL FACTORS.

- (a) ORGANIZATION.—Demonstrate ability to organize and put an aircraft squadron or repair unit in operation.
- (b) ENGINEERING DEPARTMENT.—Demonstrate ability to take charge of the Engineering Department of an aircraft squadron or repair unit.
- (c) OVERHAUL.—Demonstrate a working knowledge of the overhaul of aircraft engines and accessories; must be able to conduct the final inspection of aircraft.
- (d) STATION ASSIGNMENTS.—Demonstrate ability to draw up a watch quarter and station bill for an aircraft squadron. Be able to prepare an abandon ship bill for planes of squadron to which attached. Be able to set a watch for battle conditions in the area to which assigned.
- (e) AVIATION SEAMANSHIP.—Demonstrate ability to handle boats in the vicinity of planes and going alongside a plane. Be able to use proper methods

of towing a plane and fueling a plane from a boat. Know procedure for rescue of crew of a burning plane. Know procedure for salvage of plane and treatment of engines and instruments after immersion in salt water.

- (f) C.P.O. DUTIES.—Demonstrate ability to carry out the duties of a leading chief petty officer (personnel, operations).
- (g) D-5208.022 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) NAVAL ORGANIZATION.—Have a detailed knowledge of the naval aviation organization including all phases of squadron activity.
- (b) AVIATION RATINGS.—Be thoroughly familiar with the duties of all aviation ratings.
- (c) WATCH DUTIES.—Know the duties of a junior watch officer.
- (d) PERSONNEL DUTIES.—Have a general knowledge of the duties of an assistant personnel officer.
- (e) TECHNICAL INFORMATION.—Know where to find and how to use technical information regarding airplanes and engines.
- (f) MATERIEL.—Know where and how to obtain materiel and spare parts.
- (g) D-5208.022 (3) (B).

D-5208.023. Aviation Machinist's Mates H—(Aviation Hydraulic Mechanics).

For tentative qualifications see Bureau of Naval Personnel Circular Letter No. 280-43 and any amendments thereto.

D-5208.024. Aviation Machinist's Mates I—(Aviation Instrument Mechanics).

For tentative qualifications see Bureau of Naval Personnel Circular Letter No. 280-43 and any amendments thereto.

D-5208.025. Aviation Machinist's Mates P—(Aviation Propeller Mechanics).

For tentative qualifications see Bureau of Naval Personnel Circular Letter No. 280-43 and any amendments thereto.

D-5208.03. Aviation Electrician's Mates.

(1) AVIATION ELECTRICIAN'S MATE, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2), except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate ability to use electrician's hand tools and display suitable soldering technique.
- (c) CIRCUITS.—Demonstrate ability to detect, localize, and repair electrical faults such as "opens," "shorts," and "grounds." Demonstrate ability to check all conduit and wiring for proper anchorage of conduit nuts, bonding leads, and terminal box covers, to solder and tighten loose connections.
- (d) GENERATORS AND MOTORS.—Demonstrate ability to check operation of generators and motors, replace brushes, and clean commutators.
- (e) LIGHT SYSTEMS.—Demonstrate ability to check electric light system and to trace with an electric continuity tester such deficiencies as defective fuses, switches, and relays.
- (f) BOOSTER COIL.—Demonstrate ability to test booster coil operation and to replace defective coils.
- (g) WIRING.—Demonstrate ability to renew all wiring or replace defective wiring of airplane engine.

- (h) WARNING SIGNAL SYSTEMS.—Demonstrate ability to inspect and repair all warning signal systems employed in aircraft.
- (i) BATTERIES.—Demonstrate ability to maintain aircraft storage batteries.
- (j) BLUEPRINTS.—Demonstrate ability to read and interpret simple aircraft electric wiring blueprints.
- (k) POWER CIRCUITS.—Demonstrate ability to locate and repair simple faults in the power circuits connecting electrically operated turret, intervalometer, bombsight, SBAE, automatic pilot, and computing sight.
- (l) FIRST AID.—Demonstrate the resuscitation of a man unconscious from electric shock or submersion.
- (m) INSTRUMENTS.—Demonstrate ability to trace and localize trouble in circuits connecting all electrically operated instruments and effect repairs.

(B) EXAMINATION SUBJECTS.

- (a) SYMBOLS.—Know electrical terminology and electrical symbols.
- (b) DIRECT CURRENT.—Have general knowledge of basic direct current theory and its application to aircraft electrical systems, including:
 - (i) Ohm's law.
 - (ii) Elementary circuits (grounded and ungrounded).
 - (iii) Magnetism and electromagnetism.
 - (iv) Elementary motor and generator action.
- (c) ALTERNATING CURRENT.—Have general knowledge of alternating current theory and its application to aircraft electrical systems, including:
 - (i) Alternator action.
 - (ii) Transformer action.
 - (iii) Fluorescent lighting.
- (d) BATTERIES.—Know the construction, theory, and maintenance of storage batteries.
- (e) IGNITION.—Know simple ignition systems and magneto action.
- (f) RELAYS.—Know relay action and its application to aircraft electrical systems.
- (g) AIRCRAFT NOMENCLATURE.—Know aircraft nomenclature and be familiar with major structural features.
- (h) METALS.—Know the characteristics of aircraft metals, places in electromotive series, methods of prevention of corrosion, and methods of bonding dissimilar metals.
- (i) SELF-SYNCHRONOUS MOTORS.—Know the purposes for which self-synchronous motors are used in aircraft.
- (j) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of a Class A Aviation Electrician's Mate School or possess the equivalent in practical experience.

(2) AVIATION ELECTRICIAN'S MATE, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) GENERATORS AND MOTORS.—Demonstrate ability to remove, disassemble, assemble, and replace motors and generators, to test for all armature and field winding defects, and to make necessary commutator repairs.
- (b) BLUEPRINTS.—Demonstrate ability to trace various aircraft circuits from detailed blueprints. Know how to trace circuits on electrical plans, and to read and understand wiring diagrams of starting apparatus and electrical instruments.
- (c) REPAIRS.—Demonstrate ability to test, repair, and overhaul all types of aircraft generators and motors, including electric starting motors. Demon-

strate ability to care for, inspect, and make minor repairs to all electrical installations and circuits of aircraft to which assigned.

- (d) CONDUITS.—Demonstrate ability to assemble rigid and flexible conduits with all fittings including box connectors, bulkhead connectors, and solid-to-flexible cable connectors.
- (e) SAFETY DEVICES.—Demonstrate ability to make proper use of circuit breakers and fuses.
- (f) REGULATORS.—Demonstrate ability to make adjustments and repairs to current and voltage regulators, and to cut-outs.
- (g) IGNITION.—Demonstrate ability to detect and localize trouble in ignition systems of aircraft and to make minor repairs.
- (h) FIRE CONTROL CIRCUITS.—Demonstrate ability to trouble shoot electrical circuits on turrets, effect any electrical repairs necessary in all fire control circuits.
- (i) EMERGENCY REPAIRS.—Demonstrate ability to effect emergency repairs by substitution method on all aircraft electrical equipment in own squadron.
- (j) SHIELDING AND BONDING.—Demonstrate thorough ability in shielding and bonding circuits. Be able to detect, localize, and correct causes of radio noise.
- (k) D-5208.03 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ALTERNATING CURRENT.—Have elementary knowledge of alternating current theory and be able to solve simple A. C. problems.
- (b) POWER CIRCUITS.—Show by diagrams the relation between the generator circuit, the battery circuit, and the auxiliary power unit in aircraft.
- (c) MOTORS AND GENERATORS.—Know the construction and purposes of A. C. and D. C. motors and generators used in aircraft.
- (d) MAINTENANCE INSTRUCTIONS.—Know the instructions relating to the care and maintenance of all aircraft electrical equipment.
- (e) REGULATORS AND SAFETY DEVICES.—Know in detail the principles involved in the operation of voltage and current regulators, cut-outs, circuit breakers, relays, and fuses.
- (f) TRANSFORMERS.—Know the characteristics of current and voltage transformers used in aircraft.
- (g) VACUUM TUBES.—Know the theory of the vacuum tube and the relations between grid, plate, and filament, under various conditions.
- (h) ELECTRONIC EQUIPMENT.—Have an elementary knowledge of the operation of aircraft electronic equipment and be able to correct faulty operation by substitution of vacuum tubes.
- (i) SOLENOIDS.—Know how to maintain and install solenoids for all functional purposes.
- (j) ELECTRIC PROPELLERS.—Know the construction, principles of operation and maintenance of electric propellers, governors, and synchronizers used in own squadron.
- (k) SELSYN SYSTEM.—Have an elementary knowledge of the operation and maintenance of selsyn systems as used in aircraft.
- (l) D-5208.03 (1) (B).

(3) AVIATION ELECTRICIAN'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) ELECTRICAL HEATERS.—Demonstrate knowledge of electrical heaters used in aircraft of squadron to which attached.

- (b) LANDING GEAR SYSTEM.—Demonstrate ability to maintain and repair the landing gear electrical system used in aircraft of squadron to which attached.
- (c) ARMATURES.—Demonstrate ability to rewind armatures.
- (d) MAGNETIC EFFECTS.—Demonstrate ability to recognize and compensate the effects of operation of electrical equipment on the magnetic compass.
- (e) SUPERVISION.—Demonstrate ability to assist the leading petty officer in charge of the electrical department in aircraft overhaul bases and squadrons.
- (f) TESTING EQUIPMENT.—Demonstrate detailed knowledge of electrical testing equipment allotted to aircraft operating activities.
- (g) SELSYN SYSTEM.—Demonstrate ability to install, remove, repair, and maintain selsyn systems as applied to aircraft.
- (h) D-5208.03 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) ELECTRIC PROPELLER MECHANISMS.—Know the basic theory of operation of electrically controlled propellers, governors, and synchronizers.
- (b) HEATERS.—Explain the operation of the various types of electrical heaters used in aircraft.
- (c) INSTRUMENTS.—Know external wiring circuits for aircraft electrical instruments.
- (d) GYRO COMPASS.—Know the theory of the gyro stabilized compass in its application to aircraft.
- (e) CIRCUITS.—Know how to compute the elements of simple electrical circuits.
- (f) INSPECTION AND REPORTS.—Know how to inspect and make proper inspection reports on all electrical apparatus used in aircraft. Know how to make a report of defective and unsatisfactory material.
- (g) D-5208.03 (2) (B).

(4) AVIATION CHIEF ELECTRICIAN'S MATE.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Be qualified to take charge of and administer the electrical department in aircraft overhaul bases and squadrons.
- (b) INSTALLATION AND MAINTENANCE.—Be qualified to install, maintain, and overhaul the electrical section of the following aircraft equipment:
 - (i) *Power*.—Generators, motors, inverters, motor alternators, voltage regulators, relays, circuit breakers, heaters.
 - (ii) *Instruments*.—All instruments requiring voltage for operation and those which generate their own voltage.
 - (iii) *Lighting*.—All lights used in aircraft and their associated circuits.
 - (iv) *Armament*.—Bomb and torpedo racks, electrical circuits connecting bombsights, gun cameras, gun firing circuits, intervalometers, electric turrets, automatic flight equipment.
- (c) D-5208.03 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) EQUIPMENT.—Know the theory of operation of all electrically controlled and operated equipment in naval aircraft.
- (b) TROUBLE SHOOTING.—Know how and where to look for trouble, and know the likely causes thereof.
- (c) ELECTRICAL REPAIR SHOP.—Know how to lay out and equip an electrical repair shop.
- (d) SUPPLY.—Know how to obtain equipment and spare parts.
- (e) D-5208.03 (3) (B).

D-5208.04. Aviation Radiomen.

(1) AVIATION RADIOMAN, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2).
- (b) OPERATING.—Demonstrate ability to operate and adjust all aircraft radio equipment in the aircraft to which assigned. This includes the shifting of frequencies within the time limit and degree of accuracy set as standard within the fleet or force to which attached. Demonstrate ability to use a standard aircraft frequency meter in calibration and measurement of all frequency adjustments. Have a practical knowledge of the purpose of controls and their effect upon operation of the equipment.
- (c) REPAIRS.—Demonstrate ability to recognize failures in aircraft radio equipment and make simple repairs which might be accomplished in flight, such as replacement of defective vacuum tubes, fuses, loose plugs, interlocks, disconnected leads, etc.
- (d) COMMUNICATIONS.—Demonstrate ability to conduct efficient communications by each of the following methods:
 - (i) Semaphore (10 w.p.m.)
 - (ii) Blinker (Flashing light) (10 w.p.m.)
 - (iii) Flag Hoist.
 - (iv) Hand tapping (by authorized method) (8 w.p.m.)
- (e) AERIAL MACHINE GUNNER.—If assigned to a combat type squadron, demonstrate ability to function efficiently as an aerial machine gunner in the type of aircraft to which attached. (Marked inefficiency in aerial gunnery and definite incapability to withstand air sickness and high altitude conditions may be considered as disqualifying.) Demonstrate ability to assemble, disassemble, adjust, and maintain the type of machine gun used in the aircraft to which attached.
- (f) WATCH STANDING.—Demonstrate ability to stand watch and carry on efficiently radio communications within a squadron; demonstrate ability to use operating procedure and publications pertaining to operating procedure.
- (g) DETECTION AND RANGING DEVICES.—Demonstrate ability to operate efficiently electronic ranging and detection equipment installed in own aircraft.
- (h) NAVIGATIONAL EQUIPMENT.—Demonstrate ability to adjust and operate all navigational radio equipment installed in own aircraft, including the radio direction finder. Demonstrate ability to obtain an accurate bearing with such equipment.
- (i) CODE.—Encipher and decipher a message in an authorized system and demonstrate ability to use current cryptographic aids required for operation on aircraft radio circuits.

(B) EXAMINATION SUBJECTS.

- (a) TRANSMITTING AND RECEIVING.—Transmit and receive according to the standard tests given below.
- (b) OPERATIONAL THEORY.—Have an elementary knowledge of the general operational theory of principal aircraft radio equipment in his airplane, including:
 - (i) Frequency ranges.
 - (ii) Sequence of tuning and operation.
 - (iii) Location of fuses and interlocks.
- (c) POWER SUPPLY.—Have an elementary knowledge of the source of electrical power supply in his airplane including direct and alternating current

generators and reverse current cut-outs. Be able to recognize trouble or a defective system by readings of the voltmeter or ammeter installed in the aircraft.

- (d) BATTERIES.—Have a working knowledge of the uses and care of batteries used in naval aircraft radio equipment, including the limits on charging voltage and output current and procedure for keeping fluid level correct.
- (e) AERIAL MACHINE GUN.—If assigned to a combat type squadron, know the cycle of operation of the basic aircraft machine gun, and identification of types of machine gun ammunition.
- (f) OPERATING PROCEDURE.—Have a complete knowledge of naval radio telegraphic and telephonic operating procedure.
- (g) DISTRESS COMMUNICATION PROCEDURE.—Know the procedure for communication with a ship or aircraft in distress. This shall include communication by radio, flashing lights, and pyrotechnics.
- (h) SAFETY PRECAUTIONS.—Know the safety precautions to be observed with all high voltage electronic equipment.
- (i) AIRCRAFT STRUCTURE.—Have an elementary knowledge of basic structural parts of aircraft.
- (j) SECURITY.—Know the principles of, and requirements for maintenance of communications security.
- (k) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Graduation from a Class A Aviation Radioman School. (This requirement may be waived by the commanding officer, if the candidate meets the qualifications in (1) (A), and (1) (B) above with an excellent performance and examination record.)

(2) AVIATION RADIOMAN, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) CHECKING EQUIPMENT.—Demonstrate ability to perform routine pre-flight checks of all radio equipment in the aircraft to which assigned. This shall include tube testing, voltage measurements, dynamotor upkeep, and bench alignment of tuned circuits.
- (b) FREQUENCY AND RECOGNITION PLANS.—Demonstrate ability to interpret own fleet and force frequency and recognition plans as applied to aircraft.
- (c) CONVOY SIGNALS AND INTERNATIONAL CODE.—Demonstrate method used in interpreting convoy signals and international code of signals.
- (d) PYROTECHNIC EQUIPMENT.—Demonstrate knowledge of the location and uses of all pyrotechnic equipment in the plane to which assigned.
- (e) LIFE RAFTS.—Demonstrate knowledge of the proper method of inflating and handling of rubber life rafts, and routine precautions to be observed if adrift. This shall include knowledge of the quantity of emergency rations normally carried, rationing of such rations, and uses of the equipment normally carried.
- (f) D-5208.04 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) TRANSMITTING AND RECEIVING.—Transmit and receive according to the standard tests given below.
- (b) BASIC ELECTRICITY.—Have an elementary knowledge of basic electrical and radio theory, including the following:
 - (i) Relationship of current, voltage, and resistance.
 - (ii) Ohm's law for simple circuits.

- (iii) Electrical circuits, series, parallel, and series-parallel.
 - (iv) Magnetism and electro-magnetism.
 - (v) Generator and motor principles.
 - (vi) Vacuum tube theory.
 - (c) AIRCRAFT RADIO.—Have a working knowledge of the operation, adjustment, calibration, and maintenance of all aircraft radio equipment in the airplane to which assigned.
 - (d) NAVIGATIONAL EQUIPMENT.—Possess an elementary knowledge of the principles of operation of all aircraft radio navigational equipment.
 - (e) NAVAL COMMUNICATION PROCEDURE.—Possess a detailed knowledge of communication instructions and naval organization and demonstrate ability to route messages from own ship or station through the chain of command.
 - (f) COMMERCIAL AND INTERNATIONAL PROCEDURE.—Have a general knowledge of commercial and international procedure; know the rules regarding communications as prescribed for safety of life at sea.
 - (g) AMMUNITION.—If assigned to a combat type squadron, have a good knowledge of the identification of the various types of ammunition used on aircraft, the purpose of each type, and the sequence of belting as currently prescribed in the unit or force to which attached.
 - (h) AERIAL GUNNERY.—If assigned to a combat type squadron, know the operating principles of the standard aerial machine gun including:
 - (i) Cycle of operation.
 - (ii) Correct nomenclature.
 - (iii) Changing feed, boresighting, headspacing, and timing.
 - (i) D-5208.04 (1) (B).
- (3) AVIATION RADIOMAN, FIRST CLASS.
- (A) PRACTICAL FACTORS.
- (a) REPAIRS.—Demonstrate ability to analyze trouble and make routine repairs to all aircraft radio equipment and frequency measuring equipment installed in the aircraft to which assigned.
 - (b) ELECTRONIC EQUIPMENT.—Demonstrate ability to calibrate and make minor adjustments to all electronic navigation, ranging, and detection equipment installed in naval aircraft.
 - (c) D-5208.04 (2) (A).
- (B) EXAMINATION SUBJECTS.
- (a) TRANSMITTING AND RECEIVING.—Transmit and receive according to the standard tests given below.
 - (b) RADIO CIRCUITS.—Know how to draw schematic wiring diagrams of fundamental receiver and transmitter circuits and be able readily to trace out circuits from detailed wiring diagrams. Be able to solve simple problems in A. C. and D. C. circuits.
 - (c) DIRECTION FINDERS.—Have a knowledge of deviation, azimuth, simple navigation, and calibration, in connection with operation of aircraft direction finders.
 - (d) ANTENNAS.—Have a general knowledge of the characteristics of the various types of antennas and transmission lines used on board ship and in aircraft.
 - (e) GASOLINE AND DIESEL ENGINES.—Have an elementary knowledge of the principles of gasoline and Diesel engines, and a good knowledge of their routine care and operation. This shall include an elementary knowledge of the procedure in holding a thirty-hour check on a standard aircraft engine.
 - (f) NAVIGATION.—Possess an elementary knowledge of navigation, including

knowledge of charts, dead reckoning, points of the compass, compass errors, variation, and the correction thereof, and the method of determining position or plotting course from bearings taken with direction finder or radio navigational equipment.

- (g) PYROTECHNIC AND BOMB EQUIPMENT.—Have an elementary knowledge of the construction and operation of all pyrotechnics, bomb fuzes, bomb racks, and releasing mechanism, installed in the aircraft to which assigned.
- (h) D-5208.04 (2) (B).

(4) AVIATION CHIEF RADIOMAN.

(A) PRACTICAL FACTORS.

- (a) RADIO EQUIPMENT.—Demonstrate ability to install, service, and repair all types of aircraft radio equipment.
- (b) SUPERVISION.—Demonstrate ability to perform the duties of the radioman in charge of an operating squadron.
- (c) D-5208.04 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) SUPERVISION.—Know the duties performed by the officer-in-charge of a naval shore radio station.
- (b) OPERATION.—Know how to operate and maintain all standard types of naval aircraft radio telegraph, and radio telephone transmitters and receivers, including rectifier, power, and auxiliary equipment. Know how to operate and maintain a standard type of portable Navy radio equipment.
- (c) ANTENNAS.—Be familiar with the characteristics of and be able to design radio antennas, including feeders, coupling, and adjustment for optimum operation.
- (d) RADIO WAVE PROPAGATION.—Be familiar with the theory of radio wave propagation, including knowledge of skip distance, the ionosphere, polarization of radio waves, the sunspot cycle, and its effect on wave propagation.
- (e) VACUUM TUBES.—Be familiar with the theory, construction, and use of all basic types of vacuum tubes.
- (f) DETECTION AND RANGING EQUIPMENT.—Have a general knowledge of the theory of electronic detection and ranging equipment and its application to aircraft.
- (g) ELECTRICAL EQUIPMENT.—Have a working knowledge of the electrical equipment in the plane to which assigned and the maintenance and repair thereof.
- (h) MOTORS, GENERATORS, AND TRANSFORMERS.—Be familiar with the fundamental principles of, and be able to operate and maintain the following:
 - (i) A. C. and D. C. motors and generators.
 - (ii) Power transformers.
- (i) COMMUNICATIONS SYSTEMS AND AIR LANES.—Be familiar with the organization, functions, and facilities of the Army, Coast Guard, and United States commercial communications systems and air lanes, the Civil Aeronautics Administration, and the Federal Communications Commission.
- (j) D-5208.04 (3) (B).

(5) RADIO OPERATING TESTS.—(Time limit—8 minutes each for transmitting and receiving tests.)

- (A) AVIATION RADIOMAN, THIRD CLASS.—Transmit and receive 3 messages in Class A form containing a total of 425 characters. The text of 2 of the

messages shall be in plain language and 1 in mixed numeral-letter code in groups of 5 characters.

- (B) AVIATION RADIOMAN, SECOND CLASS.—Transmit and receive 4 messages in Class A form containing a total of 525 characters. The text of 2 of the messages shall be in plain language and 2 in mixed numeral-letter code in groups of 5 characters.
- (C) AVIATION RADIOMEN, FIRST CLASS AND CHIEF.—Transmit and receive 5 messages in Class A form containing a total of 600 characters according to the standard procedure given in (6) below. The text of 2 of the messages shall be in plain language and 3 in mixed numeral-letter code in groups of 5 characters.
- (6) STANDARD TEST PROCEDURE.—The following standard procedure shall be used in giving the tests under paragraph (5) above:
 - (A) MESSAGES.—Messages shall be approximately the same length; heading containing about 30 per cent, and the text about 70 per cent of the total number of characters. Each message shall be written on a separate blank. The standard of accuracy required both for transmission and reception is 100 per cent. Two separate tests may be given in case an error has been made on the first test.
 - (B) TRANSMITTING.—Transmitting shall be done with a hand telegraph key. The transmitting time limit shall include "servicing" each message by endorsing thereon the time of transmission and the operator's sign. All errors must be corrected as on a regular circuit.
 - (C) RECEIVING.—Receiving shall include "servicing" each message by endorsing thereon the time of receipt, frequency used, and the operator's sign.

D-5208.05. Aviation Radio Technicians.

(1) AVIATION RADIO TECHNICIAN, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate mechanical ability including proper use of motor-driven and hand metal working tools normally used in routine radio servicing and installation. Demonstrate skill in the technique of soldering.
- (c) OPERATING.—Start, stop, regulate power, make necessary adjustments, and operate air-borne electronic equipment and measuring and testing devices, and know the safety precautions involved. This includes the shifting of frequencies within the degree of accuracy set as standard within the fleet or force to which attached. Be able to obtain an accurate bearing with a radio direction finder.
- (d) REPAIRS.—Demonstrate ability to make minor repairs to all air-borne electronic equipment currently used in the squadron or unit to which assigned.
- (e) TESTING.—Demonstrate ability to use properly portable test instruments necessary in the servicing and maintenance of air-borne electronic equipment. Be able to test tubes.
- (f) ELECTRICAL EQUIPMENT.—Demonstrate an elementary knowledge of the electric dynamotors, generators, voltage regulators, and batteries used with the air-borne electronic equipment in own squadron or unit, and be able to clean and make minor repairs and maintain them in proper working condition.
- (g) WIRING DIAGRAMS.—Demonstrate ability to read schematic and wiring diagrams of simple radio circuits containing radio and electrical symbols, and be able to draw such diagrams, both free hand and with the use of instruments. Be able to make a scale mechanical drawing of a simple object.

- (h) **INSTALLATION.**—Demonstrate ability to install electronic equipment in own planes, making all external connections and checking to see if equipment is properly hooked up.
- (i) **IDENTIFICATION.**—Demonstrate ability to locate and identify component parts of an actual piece of electronic equipment by reference to the associated circuit diagram.
- (j) **FIRST AID.**—Demonstrate a thorough knowledge of first aid with emphasis upon treatment for personnel suffering from electric shock and electrical burns.

(B) **EXAMINATION SUBJECTS.**

- (a) **BATTERIES.**—Know the types, uses, care, and maintenance of batteries used in naval aircraft.
- (b) **ELECTRICITY.**—Have a general knowledge of D. C. and A. C. theory.
- (c) **OPERATIONAL THEORY.**—Have a general knowledge of the principles of air-borne electronic apparatus and the details of installation necessary to successful operation. Have an elementary knowledge of the theory of the cathode ray oscilloscope.
- (d) **SAFETY PRECAUTIONS.**—Have a thorough knowledge of the safety precautions to be observed in the handling of machine guns in working near or in an airplane, and in the operation of high voltage equipment.
- (e) **ELECTRONIC EQUIPMENT.**—Have an elementary knowledge of the purpose and use of electronic equipment installed on own planes.
- (f) **AIRCRAFT STRUCTURE.**—Be familiar with the basic structural parts of aircraft
- (g) D-5203.

(2) **AVIATION RADIO TECHNICIAN, SECOND CLASS.**

(A) **PRACTICAL FACTORS.**

- (a) **REPAIRS.**—Perform routine radio and electrical repairs to aircraft electronic equipment installed in own planes. This shall include the holding of a standard periodic check. Be able to make all routine repairs to motor-generator sets used with such electronic equipment including the correction of rough commutators.
- (b) **TOOLS AND EQUIPMENT.**—Demonstrate ability to operate and use proficiently all tools and test equipment normally used in radio service work in own ship or station.
- (c) **MEASUREMENTS.**—Demonstrate knowledge of alignment procedure and make sensitivity and selectivity measurements of a standard aircraft radio receiver. Demonstrate measurement of frequency and standard wave ratio on radar equipment and antenna.
- (d) **TROUBLE SHOOTING.**—Demonstrate ability to interpret wiring diagrams comparable to those used in equipment possessed by planes in own squadron. Demonstrate familiarity with standard methods of trouble analysis and with standard instruction books furnished with air-borne electronic apparatus installed in own plane, ship, or station.
- (e) **SHIELDING AND BONDING.**—Demonstrate ability to shield and bond circuits. Be able to detect, localize, and correct causes of radio noises.
- (f) D-5208.05 (1) (A).

(B) **EXAMINATION SUBJECTS.**

- (a) **ELECTRICITY.**—Have a good knowledge of Ohm's, Lenz's, and Kirchoff's laws, and be able to apply them to the solution of practical problems.
- (b) **EQUIPMENT.**—Have a good working knowledge of the operation, adjustment, and care of aircraft electronic apparatus. Be familiar with *Aviation*

Radio Maintenance Notes and *Aviation Radar Maintenance Bulletins*, as published by the Bureau of Aeronautics.

- (c) **RADIO THEORY.**—Possess a general knowledge of radio theory such as the function of antenna system, condensers, inductors, resistors, and vacuum tubes as employed in conventional receiver and transmitter systems. Be able to make an analysis of superheterodyne receiver by stages, including RF, IF and AF amplifiers, local oscillators, power supplies, and detectors.
- (d) **CIRCUITS AND TUBES.**—Have a thorough knowledge of vacuum tube theory and conventional circuits used in the construction of air-borne electronic equipment.
- (e) **MOTOR AND GENERATOR THEORY.**—Have a good working knowledge of the theory of operation, care and maintenance of motors and generators used in connection with air-borne electronic apparatus.
- (f) **REPORTS.**—Know how to make reports on vacuum tube failure and failure of component parts. Know the general procedure for requisitioning replacement parts and tubes.
- (g) **ANTENNAS.**—Have a basic knowledge of the characteristics of the various types of antennas and transmission lines used by naval aircraft.
- (h) D-5208.05 (1) (B).

(C) **SCHOOL QUALIFICATIONS.**

- (a) Graduation from Aviation Radio Material School, or the equivalent in practical experience.

(3) **AVIATION RADIO TECHNICIAN, FIRST CLASS.**

(A) **PRACTICAL FACTORS.**

- (a) **TESTING AND MEASURING.**—Demonstrate ability to use testing and measuring equipment employed in checking performances in air-borne electronic apparatus. This includes analysis by use of the oscilloscope and signal tracing; voltage, current, and resistance analysis; and operation of all standard Navy test devices.
- (b) **REPAIRS AND ADJUSTMENTS.**—Demonstrate ability to tune properly, calibrate, make all electrical and mechanical maintenance adjustments, and repair air-borne electronic apparatus used in own plane, ship, or station.
- (c) **SUPERVISION.**—Demonstrate ability to take charge of and direct men engaged in the material upkeep of all aircraft electronic apparatus used in own plane, ship, or station.
- (d) **SUPPLIES.**—Demonstrate thorough familiarity with naval methods of accounting for stores and spare parts and with the method of obtaining replacements.
- (e) D-5208.05 (2) (A).

(B) **EXAMINATION SUBJECTS.**

- (a) **INSTALLATIONS.**—Have a detailed knowledge of service installation of aircraft electronic equipment currently used in naval aircraft. Know the structural limitations in making such installations, and have an elementary knowledge of their effect upon weight and balance of aircraft.
- (b) **ANTENNAS.**—Have a detailed knowledge of antenna theory and patterns, as applied to aircraft, including constructional details of directional and non-directional antennas, transmission lines, and wave guides.
- (c) **ULTRA-HIGH FREQUENCY THEORY.**—Have a good working knowledge of ultra-high frequency circuits and wave propagation.
- (d) **ALTERNATING CURRENT.**—Be thoroughly familiar with the principles of alternating current and be able to solve simple alternating current problems, including series and parallel circuits.

- (e) WIRING DIAGRAMS.—Be able to draw standard circuit and wiring diagrams of practical radio equipment.
- (f) PROCEDURE.—Have a general knowledge of naval radio operating procedure.
- (g) SUPPLIES.—Have a general knowledge of the naval supply system, methods of making routine reports and job order procedure.
- (h) DIRECTION FINDERS.—Have a general knowledge of deviation, azimuth, charts and calibration procedure in connection with operation of aircraft direction finders.
- (i) D-5208.05 (2) (B).

(4) AVIATION CHIEF RADIO TECHNICIAN.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to organize, direct, and supervise all personnel engaged in the maintenance and repair of electronic equipment.
- (b) ELECTRICAL REPAIRS.—Demonstrate ability to make routine repairs to a standard aircraft electrical system.
- (c) D-5208.05 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) OPERATION AND MAINTENANCE.—Know how to operate and maintain all standard types of naval radio telegraph and telephone transmitters and receivers, including rectifier, power and auxiliary equipment, and all standard types of Navy portable radio equipment.
- (b) ANTENNAS.—Be familiar with the characteristics of and be able to design antennas, including feeders, coupling, and adjustment for optimum operation with emphasis on ultra-high frequency directional arrays.
- (c) WAVE THEORY.—Be thoroughly familiar with the theory of radio wave propagation, including knowledge of skip distances, the ionosphere, the sun-spot cycle and its effect on wave propagation, with emphasis on ultra-high frequency propagation.
- (d) DIRECTION FINDERS.—Know how to install, correct, and compensate standard types of Navy radio direction finders.
- (e) NAVIGATION.—Have an elementary knowledge of navigation, including some knowledge of charts, dead reckoning, points of the compass, compass errors, and methods of determining positions by means of direction finder bearings.
- (f) ORGANIZATION.—Possess a working knowledge of communication instructions and naval organization and a general knowledge of the organization, functions, and facilities of the Army, Coast Guard, United States commercial communication systems, and the Federal Communications Commission.
- (g) D-5208.05 (3) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of an advanced Radio Material School approved by the Bureau of Naval Personnel. (The highly technical qualifications for aviation radio technicians, covering the broad field of electronic equipment, make it inadvisable to waive the school requirement for advancement to chief.)

D-5208.06. Aviation Metalsmiths.

(1) AVIATION METALSMITH, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2), except (2) (b) which is not required of nonflying personnel.

- (b) **TOOLS.**—Demonstrate ability to use, care for, and stow properly all common types of metal and wood working tools.
- (c) **SAFETY PRECAUTIONS.**—Demonstrate observance of all shop safety precautions.
- (d) **AIRCRAFT METALS.**—Demonstrate ability to identify common aircraft metals by sight tests.
- (e) **SHEET METAL AND FITTINGS.**—Demonstrate ability to fabricate simple sheet metal parts and simple steel fittings from blueprints or shop sketches. Be able to form and manufacture all types of metal tubing lines.
- (f) **FORGING.**—Be able to forge simple hand tools such as chisels and bucking bars.
- (g) **WELDING.**—Be able to set up oxyacetylene welding apparatus and perform simple welding operations on steel and aluminum.
- (h) **REPAIRS.**—Demonstrate ability to make temporary or permanent repairs to minor sheet metal parts of aircraft, using all types of rivets.
- (i) **PLASTICS.**—Be able to inspect and repair transparent plastics used in aircraft.
- (j) **FABRIC.**—Be able to make minor repairs to all fabric covered skin surfaces, such as for X, L, and T shaped tears, small patches, and insert patches.
- (k) **WOOD.**—Be able to design and construct various wooden form blocks for use in sheet metal repair work.
- (l) **STRUCTURAL PARTS.**—Be able to assemble and disassemble all airplane structural parts such as wings, control surfaces, landing gear, etc., on own planes.
- (m) **CONTROL CABLES.**—Be able to hand swage and splice aircraft control cable.
- (n) **SELF SEALING FUEL CELLS.**—Be able to make simple emergency repairs to self sealing fuel cells.

(B) **EXAMINATION SUBJECTS.**

- (a) **ORGANIZATION AND REGULATIONS.**—Knowledge of regulations and procedures governing naval aviation, including squadron organization.
- (b) **AIRPLANE NOMENCLATURE.**—Knowledge of airplane nomenclature and basic theory of flight.
- (c) **BLUEPRINTS.**—Knowledge of elementary drafting and blueprint reading.
- (d) **METALS.**—Knowledge of the classes and physical properties of ferrous and non-ferrous aviation metals.
- (e) **IDENTIFICATION SYSTEMS.**—Knowledge of the S.A.E. steel numbering system. Knowledge of the Navy code and lettering system for aluminum alloy.
- (f) **CORROSION PREVENTION.**—Knowledge of corrosion prevention procedures.
- (g) **HEAT TREATING.**—Elementary knowledge of heat treating purposes and procedures.
- (h) **FABRICS.**—Knowledge of the use and application of aircraft fabrics, tapes, and dopes.
- (i) **METALLIZING AND SANDBLASTING.**—Elementary knowledge of sandblasting and metallizing operations.
- (j) **D-5203.**

(C) **SCHOOL QUALIFICATIONS.**

- (a) Must be a graduate of a Class A Aviation Metalsmith School or possess the equivalent in practical experience.

(2) **AVIATION METALSMITH, SECOND CLASS.**

(A) **PRACTICAL FACTORS.**

- (a) **HAND TOOLS.**—Demonstrate ability to design and forge small hand tools.

- (b) ANNEALING.—Be able to anneal aluminum alloy sheet and copper tubing using emergency methods when necessary.
- (c) REPAIRS.—Demonstrate ability to repair all types of removable sheet metal sections. Demonstrate ability to inspect and determine what repairs should be made.
- (d) RIVETING.—Demonstrate ability to do all types of airplane riveting including the use of special rivets and fasteners.
- (e) SKIN REPAIRS.—Demonstrate ability to make skin repairs on float and hulls.
- (f) WELDING.—Demonstrate ability to weld ferrous and aluminum alloys. Be able to braze applicable metals.
- (g) ALIGNMENT.—Be able to align all airplane parts such as wings, control surfaces, landing gear, etc.
- (h) FABRIC.—Be able to make repairs to and refinish fabric covering on aircraft structures.
- (i) WOOD AND PLASTICS.—Be able to make all minor repairs to wooden or plastic structures of an airplane.
- (j) CONTROL SYSTEMS.—Be able to inspect, install, and adjust all mechanical control systems on own airplanes.
- (k) TUBING.—Be able to inspect and install all types of metal tubing lines. Be able to identify all tubing by markings.
- (l) FUEL TANKS.—Be able to remove, clean, inspect, and install all types of fuel tanks and cells. Be able to test for leaks and make necessary repairs to all types of metal fuel and oil tanks, observing all safety precautions.
- (m) STRUCTURAL REPAIRS.—Be able to make complicated structural repairs on own airplanes, such as replacement and splicing of stringers, bulkheads, etc.
- (n) JIGS AND TEMPLATES.—Be able to make necessary jigs and templates for fabrication of aircraft structural parts.
- (o) D-5208.06 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) HEAT TREATING.—Knowledge of the principles of and reasons for heat treatment of aluminum and steel alloys. Knowledge of the composition of airplane steel and steel alloys.
- (b) STRUCTURES.—General knowledge of all types of stresses and strains on all airplane structural members.
- (c) ELECTRO-PLATING.—Elementary knowledge of the principles and processes of electro-plating, anodizing, and passivating.
- (d) WELDING AND BRAZING.—Knowledge of the principles of welding and brazing airplane metals.
- (e) PLASTICS.—Elementary knowledge of the characteristics and uses of plastics used in airplane skin and structures.
- (f) WOOD AND FABRIC.—Knowledge of the characteristics of wood, fabric, and fabric finishes used in airplane construction. Knowledge of the preparation and application of wood glues.
- (g) PLANE CAPTAIN.—Knowledge of the general duties of a plane captain.
- (h) D-5208.06 (1) (B).

(3) AVIATION METALSMITH, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) REQUISITIONS.—Demonstrate ability to order stock from a standard stock catalogue.
- (b) TECHNICAL NOTES AND ORDERS.—Demonstrate ability to interpret and execute all technical notes and orders.

- (c) METALS.—Be able to identify various types of metals by sight or shop tests.
- (d) STRUCTURE.—Be able to make all structural changes on own airplanes from change bulletins.
- (e) REPAIRS.—Demonstrate ability to make repairs to all types of stressed skin. Be able to repair, splice, and weld all airplane tubular structures.
- (f) FITTINGS.—Be able to fabricate, heat treat, and install steel airplane fittings.
- (g) RIGGING.—Be able to make necessary changes and alterations for proper rigging of own airplanes.
- (h) FUEL CELLS.—Be able to make permanent repairs to self sealing fuel cells, including replacement of all metal fittings and connections.
- (i) SUPERVISION.—Demonstrate ability to supervise the work and training of personnel in the duties of an aviation metalsmith.
- (j) D-5208.06 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) TECHNICAL NOTES.—Knowledge of the origin and interpretation of all technical notes and orders.
- (b) AIRPLANE METALS.—Knowledge of the composition of all airplane metals.
- (c) WOOD.—Knowledge of the principles governing repairs to the wooden structural parts of an airplane.
- (d) AERODYNAMICS.—Knowledge of the basic aerodynamic principles governing the rigging of airplanes.
- (e) CORROSION PREVENTION.—Knowledge of surface treatment for magnesium alloys.
- (f) WELDING.—Knowledge of the special technique required for welding magnesium alloys.
- (g) D-5208.06 (2) (B).

(4) AVIATION CHIEF METALSMITH.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to assume the duties of an airplane squadron structural officer. Demonstrate ability to equip and supervise an aviation metalsmith shop.
- (b) INSTALLATION OF AIRPLANE CHANGES.—Demonstrate ability to interpret and supervise the installation of airplane changes.
- (c) D-5208.06 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Knowledge of all phases of aviation administrative organization.
- (b) METALLURGY.—Knowledge of practical metallurgy as applied to metals used in the construction and repair of aircraft.
- (c) SPECIFICATIONS.—Knowledge of preparation of metals to meet airplane construction or repair qualifications.
- (d) D-5208.06 (3) (B).

D-5208.07. Aviation Ordnancemen.

(1) AVIATION ORDNANCEMAN, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2), except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate ability to use and care for common hand and small power tools used in aviation ordnance work. Demonstrate ability to use headspace and timing gages.

- (c) WORKING DRAWINGS.—Demonstrate ability to read working drawings, simple wiring diagrams and blueprints, and shop sketches pertaining to aviation ordnance.
- (d) INSTALLATIONS.—Demonstrate ability properly to install and adjust aircraft guns, rails, shackles, gun cameras and torpedo cameras, pyrotechnics dischargers, and target equipment. Be able to assemble, disassemble, bore-sight, and synchronize aircraft guns.
- (e) MAINTENANCE.—Demonstrate ability properly to care for and perform line maintenance of small arms, aircraft guns, shackles, racks, rails, target equipment, munition handling equipment, and aircraft munitions.
- (f) OPERATION.—Demonstrate ability to test-fire small arms and aircraft guns.
- (g) REARMING.—Demonstrate ability properly to load (including fuzing) all aircraft munitions in aircraft of own squadron.
- (h) STOWAGE AND HANDLING.—Demonstrate ability properly to remove from stowage, uncrate, and make ready aircraft munitions.
- (i) SAFETY PRECAUTIONS.—Demonstrate ability to observe all safety precautions in handling aircraft munitions.
- (j) SIGHTS.—Demonstrate ability to install and boresight all types of sights used in own squadron. Be able to identify all aviation fire control equipment.

(B) EXAMINATION SUBJECTS.

- (a) MATHEMATICS.—Have a knowledge of shop mathematics.
- (b) ELECTRICITY.—Have a practical working knowledge of the electrical circuits used in aviation ordnance.
- (c) AIRCRAFT MUNITIONS.—Know the types and identifying markings of all aircraft munitions including small arms and aircraft gun ammunition, bombs, torpedoes, mines, rockets, and pyrotechnics.
- (d) SAFETY PRECAUTIONS.—Know all aviation ordnance safety regulations and instructions pertaining to the above equipment and munitions.
- (e) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Graduation from Class A Aviation Ordnance School or possession of the equivalent in practical experience.

(2) AVIATION ORDNANCEMAN, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) MAINTENANCE.—Demonstrate ability to maintain pyrotechnic dischargers, smoke tanks and dischargers, gun cameras and torpedo cameras, target equipment, and munition handling equipment.
- (b) OPERATION.—Demonstrate ability to operate target equipment and to load and operate gun cameras and torpedo cameras.
- (c) REPAIRS.—Demonstrate ability to make all minor repairs and replacements to small arms, aircraft guns, rails, racks, and shackles.
- (d) FUZES.—Demonstrate ability to assemble and disassemble fuzes used in own squadron.
- (e) SUPERVISION.—Demonstrate ability to take charge of a loading and re-arming crew.
- (f) TURRETS.—Demonstrate ability to make field adjustments and minor repairs of turrets.
- (g) D-5208.07 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MUNITIONS.—Have a general knowledge of the composition and character-

istics of explosives. Know the tactical uses, characteristics, and principles of operation of all aircraft munitions, including a thorough knowledge of the operation of fuzes used in own squadron. Know current instructions for belting ammunition for different type missions.

- (b) TURRETS.—Know the construction and principles of operation of turrets used in own squadron.
- (c) SAFETY.—Know the safety factors and strength limitations of munitions handling equipment.
- (d) D-5208.07 (1) (B).

(C) SCHOOL QUALIFICATION.

- (a) D-5208.07 (1) (C).

(3) AVIATION ORDNANCEMAN, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) MUNITIONS STOWAGE.—Demonstrate ability to draw up plans and direct the stowage of aircraft munitions ashore. Be able to supervise stowage of aircraft munitions afloat.
- (b) POWER TURRETS.—Demonstrate ability to zone power turrets.
- (c) AIRCRAFT TORPEDOES.—Demonstrate ability to take charge of a crew in arming and installing aircraft torpedoes, if used in own squadron.
- (d) FUZES.—Demonstrate ability to assemble and disassemble all service type fuzes. Be able to make adjustments and repairs.
- (e) SUPERVISION.—Demonstrate ability to organize and direct a squadron ordnance crew.
- (f) TECHNICAL NOTES AND ORDERS.—Demonstrate ability to interpret and execute all technical notes and orders relating to aviation ordnance.
- (g) D-5208.07 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) SAFETY PRECAUTIONS.—Know the safety precautions in loading and unloading torpedoes.
- (b) FUZES.—Have a thorough knowledge of the operation of all service type fuzes.
- (c) SUPPLIES.—Know the procedure and regulations for procurement of aviation ordnance equipment and spares.
- (d) PUBLICATIONS.—Have a working knowledge of the Bureau of Ordnance orders and technical notes relating to aviation ordnance.
- (e) SERVICE AIRCRAFT ARMAMENT.—Have a knowledge of the armament of current types of service aircraft.
- (f) D-5208.07 (2) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5208.07 (1) (C).

(4) AVIATION CHIEF ORDNANCEMAN.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to organize and direct a squadron ordnance shop.
- (b) SUPPLIES.—Demonstrate ability to estimate, requisition, and keep accounts of aviation ordnance materiel.
- (c) C. P. O. DUTIES.—Demonstrate ability to assume the duties of the leading C.P.O. of a squadron.
- (d) D-5208.07 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) EXPLOSIVES.—Have a thorough knowledge of the composition of all types of aircraft munitions and the safety regulations concerning the handling, use, and stowage of each.
- (b) ALLOWANCE LISTS AND PROCUREMENT.—Have a thorough knowledge of allowance lists and procurement of aviation ordnance.
- (c) D-5208.07 (3) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5208.07 (1) (C).

D-5208.071. Aviation Ordnancemen B—(Aviation Bombsight Mechanics).

For tentative qualifications see Bureau of Naval Personnel Circular Letter No. 280-43 and any amendments thereto.

D-5208.072. Aviation Ordnancemen T—(Aviation Turret Mechanics).

(1) AVIATION ORDNANCEMAN T, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2), except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate ability to use and care for all hand tools, power tools, and special equipment employed in maintenance of electric and hydraulic turrets. Be able to do simple soldering.
- (c) SAFETY PRECAUTIONS.—Demonstrate ability to observe necessary safety precautions in the installation and maintenance of electric and hydraulic turrets.
- (d) BLUEPRINTS AND WIRING DIAGRAMS.—Demonstrate ability to read and work from blueprints, wiring diagrams, and schematic diagrams relating to electric and hydraulic turrets.
- (e) HYDRAULIC TURRETS.—Demonstrate ability to adjust, locate defects in, and make minor repairs to hydraulic turrets.
- (f) ELECTRIC TURRETS.—Demonstrate ability to locate minor electrical troubles, such as shorts, opens, and grounds, and make necessary repairs. Be able to test and inspect electric turrets and make minor replacements of parts such as coils, relays, and brushes.
- (g) WIRING.—Be able to check all wiring for proper anchorage of conduits and terminal boxes and to correct defective connections.

(B) EXAMINATION SUBJECTS.

- (a) ELECTRICITY.—Have a working knowledge of the basic principles of electricity including Ohm's law, electro-magnetism, and principles of relays, measuring instruments, and motors. Know electrical terminology and symbols.
- (b) HYDRAULICS.—Have a thorough knowledge of the principles of hydraulics.
- (c) TURRETS.—Have a basic knowledge of the structure and theory of operation of electric and hydraulic turrets.
- (d) MATERIALS.—Have a working knowledge of the characteristics and uses of materials used in electric and hydraulic turrets.
- (e) TECHNICAL INFORMATION.—Know where to find and how to use technical information and literature relating to turrets.
- (f) SUPPLIES.—Know where and how to obtain matériel and spare parts for turrets.
- (g) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of a Class A school for aviation ordnancemen or have demonstrated ability to meet the qualifications for aviation ordnanceman, third class.
- (b) Must, in addition, be a graduate of a Class B Turret School or have demonstrated the possession of equivalent qualifications.

(2) AVIATION ORDNANCEMAN T, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) MOTORS.—Demonstrate ability to remove, repair, and replace turret drive motors. Demonstrate ability to adjust speed and load of electric motors.
- (b) TURRETS.—Demonstrate ability to maintain and repair electric and hydraulic turrets.
- (c) REARMING.—Be able to rearm planes of the squadron to which attached.
- (d) D-5208.072 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) TURRETS.—Have a thorough knowledge of the operating principles of electric and hydraulic turrets and their component parts.
- (b) SIGHTS.—Know the principles and methods of operation of sights which actuate aircraft turrets. Know the procedure for connecting sights with turret mechanisms.
- (c) D-5208.072 (1) (B).

(3) AVIATION ORDNANCEMAN T, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to supervise the work and training of personnel maintaining and repairing turrets.
- (b) TURRETS.—Demonstrate ability to remove and install turrets. Be able to maintain remote control turrets.
- (c) OVERHAUL.—Demonstrate ability to overhaul electric and hydraulic turrets.
- (d) REARMING.—Be able to take charge of a loading and rearming crew.
- (e) D-5208.072 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) FIRE CONTROL.—Have a basic knowledge of the principles of boresighting, zoning, and harmonization.
- (b) RIGGING.—Have a working knowledge of equipment, procedure, and safety precautions involved in removing and installing turrets including parting strength of cables, and use of slings.
- (c) REPORTS.—Have a knowledge of reports and returns required for turrets.
- (d) D-5208.072 (2) (B).

(4) AVIATION CHIEF ORDNANCEMAN T.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to organize and direct a squadron turret maintenance ship or overhaul shop and keep all turrets in satisfactory operating condition.
- (b) REARMING.—Demonstrate ability to supervise the rearming of a squadron.
- (c) D-5208.072 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) SUPPLIES.—Have a thorough knowledge of allowance lists and procurement of spare parts of electric and hydraulic turrets.
- (b) D-5208.072 (3) (B).

D-5208.08. Airship Riggers.

(1) AIRSHIP RIGGER, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2).
- (b) OPERATION.—Demonstrate ability to operate all airship controls on the ground and in the air. Demonstrate ability in the air to maintain level flight and steer steady course under supervision. Demonstrate familiarity with the functioning and operation of all equipment in the airship except radio, engineering, and special equipment.
- (c) PRESSURE MAINTENANCE.—Demonstrate ability to maintain proper pressure and trim of an airship when docked or on the mast.
- (d) FABRIC REPAIRS.—Demonstrate ability to make all kinds of routine and emergency airship fabric repairs.
- (e) CABLES AND TERMINALS.—Demonstrate ability to splice airship cables and manufacture terminals.
- (f) SEAMANSHIP.—Demonstrate ability as a good seaman. Demonstrate ability in the proper maintenance of ground tackle. Demonstrate ability in the proper care and use of mooring and handling lines. Demonstrate knowledge of signal flags and semaphore.
- (g) INSTRUMENTS.—Demonstrate understanding of all types of instruments used in the operation of balloons and nonrigid airships.
- (h) ORDNANCE.—Demonstrate ability to operate all ordnance equipment used in nonrigid airships.
- (i) WEIGH OFFS.—Demonstrate ability to make hangar and mast weigh offs.
- (j) ADJUSTABLE PARTS.—Demonstrate knowledge of approved settings of adjustable parts, i.e., air and gas valves, tensions of batten cables, fin brace cables, internal suspension cables, etc.

(B) EXAMINATION SUBJECTS.

- (a) NOMENCLATURE.—Familiarity with the nomenclature of lighter-than-air craft and ground handling gear.
- (b) FLIGHT.—General knowledge of principles and theories of flight.
- (c) SIGNALS.—Knowledge of all signals used by mooring officers in mooring, unmooring, take-off, landing, docking, and undocking of airships.
- (d) ORDNANCE.—Familiarity with all types of ordnance equipment used in nonrigid airships.
- (e) LIFESAVING EQUIPMENT.—Familiarity with the operation and upkeep of all airship lifesaving equipment.
- (f) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Must be designated "Qualified LTA" (LA) after graduating from an Airship Training School or after having otherwise completed the requirements as a result of training in a Blimp Squadron or a Blimp Headquarters Squadron.

(2) AIRSHIP RIGGER, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) HANGAR WATCH.—Demonstrate ability to take charge of a hangar watch. Demonstrate thorough familiarity with dock routine.
- (b) MAST WATCH.—Demonstrate ability to take charge of a mast watch. Demonstrate thorough familiarity with mast watch routine.
- (c) RIGGING.—Demonstrate ability to renew major or minor control cables, handling lines, fin brace wires, and nose cables. Demonstrate ability to replace nose battens and measure all external suspensions thereof.

- (d) VALVES.—Demonstrate ability to set and adjust helium and air valves.
- (e) MAINTENANCE CREW.—Demonstrate ability to take charge of a maintenance crew.
- (f) D-5208.08 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) CONTROLS AND EQUIPMENT.—Familiarity with the servicing of all controls and equipment in an airship except radio, engineering, and special equipment.
- (b) UPKEEP RIGGER.—Understand the duties of the upkeep rigger in flight and in dock.
- (c) GAS TESTS.—Understand the several methods of ascertaining the purity of lifting gases in a nonrigid airship.
- (d) D-5208.08 (1) (B).

(3) AIRSHIP RIGGER, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) FREE BALLOON.—Demonstrate ability to lay out, inflate, and prepare a free balloon for flight.
- (b) CONTROLS AND EQUIPMENT.—Demonstrate ability to break down, repair, and reassemble all controls and equipment in an airship except radio, engineering, and special equipment.
- (c) MOORING MAST.—Demonstrate ability to assemble and erect an expeditionary mooring mast.
- (d) RIGGING.—Demonstrate ability to measure all tensions.
- (e) PURGING.—Demonstrate ability to take charge of purging and topping up of airships.
- (f) PURITY READINGS.—Demonstrate ability to take purity readings with diffusion-type meter.
- (g) D-5208.08 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) RIGGING.—Thorough knowledge of the internal and external suspensions in a nonrigid airship.
- (b) WEATHER.—Know the laws of storms, including the indications of storms common to North America (northeaster, tropical hurricane, norther, and Santa Ana), and the necessary precautions to be observed in flight and on the ground.
- (c) LANDING WHEEL ASSEMBLY.—Thorough knowledge of landing wheel assemblies installed on airships to which assigned.
- (d) SAFETY PRECAUTIONS.—Familiarity with all safety precautions to be observed during ground handling, purging, fueling, deflating, or inflating a nonrigid airship. Thorough knowledge of safety factors involved in the handling of hydrogen gas and gasoline.
- (e) D-5208.08 (2) (B).

(4) CHIEF AIRSHIP RIGGER.

(A) PRACTICAL FACTORS.

- (a) NONRIGID AIRSHIP.—Demonstrate ability to deflate, inflate, and rig a nonrigid airship for flight.
- (b) MOORING MAST.—Demonstrate ability to assemble and erect a mobile mooring mast.
- (c) SALVAGE PARTY.—Demonstrate ability to take charge of a salvage party.
- (d) GROUND HANDLING OFFICER.—Demonstrate a thorough knowledge of the duties of the ground handling officer.

- (e) INTERIM OVERHAUL.—Demonstrate ability to take charge of and supervise the interim overhaul of more than one airship.
- (f) D-5208.08 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) AERODYNAMICS.—Know the effects of engines, rudder, and elevator on a nonrigid airship.
- (b) D-5208.08 (3) (B).

D-5208.09. Parachute Riggers.

(1) PARACHUTE RIGGER, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate ability to use the tools applicable to parachute rigging.
- (c) PACKING.—Demonstrate ability to pack all service types of parachutes. Be able to pack parachutes under emergency conditions, without the aid of packing tools or loft conveniences.
- (d) STAINS AND CLEANING.—Demonstrate ability to recognize stains commonly found in parachutes in service. Be able to use proper methods of cleaning and washing parachutes.
- (e) PACKED PARACHUTES.—Demonstrate ability to handle packed parachutes properly.
- (f) INFLATABLE FLOTATION EQUIPMENT.—Be able to operate and care for inflatable flotation equipment.
- (g) REPAIRS.—Demonstrate ability to make minor repairs to parachutes.
- (h) SEWING MACHINES.—Demonstrate ability to time and operate sewing machines used in own ship or station.
- (i) FLIGHT CLOTHING.—Demonstrate ability to make minor repairs to flight clothing.

(B) EXAMINATION SUBJECTS.

- (a) EVOLUTION OF PARACHUTES.—Have a general knowledge of the evolution of parachutes.
- (b) PARACHUTES AND MATERIALS.—Know the component parts of a parachute, including construction and function. Have a knowledge of the care and handling of silk, synthetic fabrics, and other fabrics used in parachutes and aviation gear.
- (c) PARACHUTE CARE.—Know the procedure and methods for inspection, drying, airing, and storage of parachutes.
- (d) TOOLS.—Know the names and uses of the tools used in parachute rigging.
- (e) LIFESAVING EQUIPMENT.—Know the nomenclature and principles of operation of all parts and accessories of lifesaving equipment, including life jackets, life rafts, safety belts, rescue kits, and pyrotechnics. Know the regulations and safety precautions to be observed.
- (f) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Be a graduate of Naval Training School for Parachute Riggers.

(2) PARACHUTE RIGGER, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) EQUIPMENT.—Demonstrate a familiarity with the operation and care of equipment used in conjunction with parachute work.

- (b) SUB-ASSEMBLIES.—Demonstrate ability to cut, sew, and replace sub-assemblies of a parachute. (Minor repairs only.)
 - (c) INSPECTION.—Demonstrate ability to inspect parachutes for tears and weakened parts. Demonstrate ability to inspect containers for defects and structural weaknesses.
 - (d) FLIGHT CLOTHING.—Demonstrate ability to make major repairs to flight clothing.
 - (e) FABRIC EQUIPMENT.—Demonstrate ability to inspect and repair fabric emergency equipment used in aviation.
 - (f) INFLATABLE FLOTATION EQUIPMENT.—Demonstrate ability to inspect and make minor repairs to inflatable flotation equipment including carbon dioxide tubes and connections.
 - (g) TESTS AND REPORTS.—Demonstrate ability to rig equipment and conduct dummy drop and destruction tests. Be able to make out all reports.
 - (h) BLUEPRINTS.—Demonstrate ability to read blueprints relating to parachutes and lifesaving equipment.
 - (i) D-5208.09 (1) (A).
- (B) EXAMINATION SUBJECTS.
- (a) FABRICS.—Know the composition and characteristics of various types of fabrics used in aviation.
 - (b) DROP TEST PROCEDURE.—Have a thorough knowledge of drop test procedure.
 - (c) LIFESAVING EQUIPMENT.—Know specifications for all lifesaving equipment. Have a thorough knowledge of Bureau of Aeronautics notes and instructions relating to lifesaving equipment.
 - (d) D-5208.09 (1) (B).
- (3) PARACHUTE RIGGER, FIRST CLASS.
- (A) PRACTICAL FACTORS.
- (a) SUPERVISION.—Demonstrate ability to supervise the work and training of personnel maintaining and repairing parachutes.
 - (b) SEWING MACHINE.—Demonstrate ability to overhaul a sewing machine.
 - (c) FABRIC GEAR.—Demonstrate ability to cut, assemble, and sew gear made or repaired in parachute rigging shops.
 - (d) RECORDS AND REPORTS.—Demonstrate ability to make out Bureau of Aeronautics forms and reports, including drop test forms.
 - (e) MAJOR AND MINOR REPAIRS.—Be able to classify repair jobs as major or minor and determine whether they may be repaired on the ship or station.
 - (f) D-5208.09 (2) (A).
- (B) EXAMINATION SUBJECTS.
- (a) FABRICS.—Have a knowledge of the weaving of fabrics used in aviation and their uses.
 - (b) CARGO CHUTES.—Have a knowledge of the rigging and use of cargo chutes and know how to direct the dropping of supplies and equipment.
 - (c) CARBON DIOXIDE GAS.—Be familiar with the composition and characteristics of carbon dioxide gas and its use for flotation equipment.
 - (d) PARACHUTE LOFT.—Know how to outfit and rig a parachute loft.
 - (e) LIFESAVING SUPPLIES AND EQUIPMENT.—Understand Navy Stores Titles and procedure for obtaining lifesaving equipment and supplies.
 - (f) PARACHUTES.—Have a knowledge of rates of descents, ventage, porosity, and shock loads of parachutes.
 - (g) D-5208.09 (2) (B).

(4) CHIEF PARACHUTE RIGGER.

(A) PRACTICAL FACTORS.

- (a) ORGANIZATION.—Demonstrate ability to organize and direct a parachute rigging and repair shop.
- (b) REPAIRS.—Demonstrate ability to do major overhaul operations and rebuild lifesaving equipment.
- (c) LIFESAVING EQUIPMENT.—Demonstrate ability to give instruction in the handling and use of all lifesaving equipment used in aviation.
- (d) D-5208.09 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) LIFESAVING EQUIPMENT.—Know thoroughly the instructions for the handling and use of all lifesaving equipment used in aviation.
- (b) INFLATABLE FLOTATION EQUIPMENT.—Have a thorough knowledge of the construction of inflatable flotation equipment.
- (c) D-5208.09 (3) (B).

D-5208.10. Aerographer's Mates.

(1) AEROGRAPHER'S MATE, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) AEROLOGICAL DATA.—Demonstrate ability to decode the aerological data in all weather codes and enter the data on a synoptic chart or upper air chart.
- (c) PRELIMINARY ANALYSIS.—Demonstrate ability to prepare a preliminary analysis on a synoptic chart showing principal fronts, isobars, and air mass designations.
- (d) AEROLOGICAL INSTRUMENTS.—Demonstrate ability to take readings of aerological instruments and make routine observations. Demonstrate a knowledge of the operation and care of aerological instruments.
- (e) PILOT BALLOON SOUNDING.—Demonstrate ability to make a pilot balloon sounding and compute the results.
- (f) TYPEWRITING.—Demonstrate ability to operate a typewriter sufficiently to do accurate work at a reasonable speed.
- (g) CORRESPONDENCE.—Demonstrate familiarity with official forms of correspondence in use in the Navy and the regulations and instructions regarding preparation of correspondence.
- (h) AEROLOGICAL TABLES.—Demonstrate ability to use required aerological tables.

(B) EXAMINATION SUBJECTS.

- (a) NAVAL PUBLICATIONS.—Know where to find information pertinent to aerological activities in standard naval publications.
- (b) TECHNICAL PUBLICATIONS.—Have a working knowledge of the main subjects covered in the *Aerographer's Manual*, the *International Cloud Atlas*, and *Elementary Meteorology*.
- (c) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of the Aerographer's Mate School, or have served six (6) months as a striker at an aerological station.

(2) AEROGRAPHER'S MATE, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) WEATHER CHARTS.—Demonstrate ability to draw an accurate synoptic weather chart, showing isobars, isallobars, fronts, and air masses.

- (b) FORECASTS.—Demonstrate proficiency in the preparation of local forecasts for surface craft or aircraft operations.
- (c) RADIO SONDE OBSERVATIONS.—Demonstrate ability to make radio sonde observations, inflate balloons, check readings, and operate recorder, if carried in own ship or station.
- (d) AEROLOGICAL INSTRUMENTS.—Demonstrate a thorough knowledge of the operation and care of aerological instruments.
- (e) BALLISTIC WIND AND DENSITY.—Demonstrate ability to compute ballistic density for surface and antiaircraft firing.
- (f) TYPEWRITING.—Demonstrate ability to operate a typewriter at twenty-five (25) words per minute with not more than five (5) errors in a ten (10) minute test.
- (g) D-5208.10 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) AEROLOGICAL INSTRUMENTS.—Have a working knowledge of various aerological instruments including barometer, psychrometer, and thermograph.
- (b) CHARTS.—Know how to use adiabatic and pseudo-adiabatic charts.
- (c) CLOUD ATLAS AND ELEMENTARY METEOROLOGY.—Have a thorough knowledge of the subjects covered in the *International Cloud Atlas*, and *Elementary Meteorology*.
- (d) D-5208.10 (1) (B).

(3) AEROGRAPHER'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) FORECASTING.—Demonstrate a thorough knowledge of the principles of forecasting and make routine daily forecasts from synoptic charts and local weather conditions for local and extended flights.
- (b) AEROLOGICAL INSTRUMENTS.—Demonstrate ability to maintain and make complete repairs to aerological instruments.
- (c) AEROGRAPH.—Demonstrate ability to prepare an aerograph for flight and analyze the resultant record.
- (d) TYPEWRITING.—Demonstrate ability to type thirty (30) words per minute with not more than five (5) errors in a ten (10) minute test.
- (e) D-5208.10 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) NAVY PUBLICATIONS.—Have a thorough knowledge of the pertinent sections of the *U. S. Navy Regulations*, bureau manuals, and general orders.
- (b) TECHNICAL PUBLICATIONS.—Have a thorough knowledge of the *Aerographer's Manual* and a thorough understanding of synoptic meteorology and forecasting and meteorology for pilots.
- (c) PHYSICS.—Have a working knowledge of elementary physics.
- (d) AEROLOGICAL INSTRUMENTS.—Have a thorough knowledge of the principles of various aerological instruments including aerograph, barograph, hygograph, hygrothermograph, radio sonde, and theodolite.
- (e) AEROLOGICAL CHARTS.—Have a general knowledge of the use of aerological charts for plotting data obtained from upper air soundings.
- (f) WEATHER CONDITIONS.—Have a general knowledge of weather conditions over all ocean areas.
- (g) AEROLOGICAL OFFICE ROUTINE.—Be thoroughly familiar with aerological office routine with special attention to synoptic chart drawings and methods of upper air soundings.
- (h) D-5208.10 (2) (B).

(4) CHIEF AEROGRAPHER'S MATE.

(A) PRACTICAL FACTORS.

- (a) AEROLOGICAL CHARTS.—Demonstrate ability to use various aerological charts for plotting and interpreting upper air information.
- (b) RADIO SONDE RECEIVER AND TRANSMITTER.—Demonstrate ability to use and operate a radio sonde receiver and transmitter and be able to evaluate upper air data obtained from a radio sonde receiver.
- (c) TESTING AND CALIBRATION OF AEROLOGICAL INSTRUMENTS.—Demonstrate the proper methods of testing and calibrating the aerological recording instruments in use aboard own ship or station.
- (d) AEROLOGICAL INSTRUMENTS.—Demonstrate a thorough knowledge of the construction, care, operation, overhaul, and repair of all types of aerological instruments.
- (e) AEROLOGICAL OFFICE.—Demonstrate the ability to draw plans for, and a thorough knowledge of the necessary procedures for installation of a complete Naval Aerological Office, afloat or ashore.
- (f) RECORDS AND REPORTS.—Demonstrate ability to prepare all types of forecasts, standard reports, and records used in aerological work.
- (g) D-5208.10 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) MAPS AND CHARTS.—Have a thorough knowledge of the preparation of synoptic maps and auxiliary charts.
- (b) RADIO SONDE SOUNDING.—Know how to analyze a radio sonde sounding.
- (c) MATHEMATICS.—Have a working knowledge of trigonometric functions.
- (d) D-5208.10 (3) (B).

D-5208.11. Photographer's Mates.

(1) PHOTOGRAPHER'S MATE, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) PHOTOGRAPHIC EQUIPMENT.—Demonstrate ability to operate, adjust, and maintain service types of photographic equipment, including aviation equipment.
- (c) NEGATIVES.—Demonstrate ability to produce properly exposed and focused negatives with regularity, using at least two service types of still cameras under a variety of conditions.
- (d) SOLUTIONS.—Demonstrate ability to mix the necessary chemicals and make the proper solutions required in photographic work.
- (e) PRINTING AND DEVELOPING.—Demonstrate ability to develop negatives and make contact and projection prints.
- (f) SLIDES AND SLIDEFILMS.—Demonstrate ability to do the photographic work required in making lantern slides and slidefilms.
- (g) MOTION PICTURE CAMERA.—Demonstrate ability to operate proficiently at least one service type of motion picture camera.

(B) EXAMINATION SUBJECTS.

- (a) NAVAL PUBLICATIONS.—Know the orders and regulations pertaining to naval photography.
- (b) EMULSIONS.—Have a working knowledge of the types, characteristics, and use of photographic emulsions.

- (c) CHEMICAL AGENTS.—Know the action of chemical agents on films and on papers.
- (d) LENSES AND SHUTTERS.—Have a general knowledge of the characteristics and defects of lenses and shutters.
- (e) FILTERS.—Have an understanding of the functions of filters and know which types to use under various conditions of atmosphere and weather.
- (f) SAFETY PRECAUTIONS.—Know the safety precautions to be observed in handling and stowing photographic equipment, chemicals, and sensitized papers and films.
- (g) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of the Naval School of Photography, or have satisfied the commanding officer that the candidate has achieved a comparable degree of competence.

(2) PHOTOGRAPHER'S MATE, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) RECONNAISSANCE PHOTOGRAPHS.—Demonstrate ability to make and process aerial reconnaissance photographs.
- (b) AERIAL CAMERAS.—Demonstrate ability to install and test electrically operated aerial cameras in aircraft.
- (c) COLOR EMULSIONS.—Demonstrate ability to expose properly color emulsions used in the service.
- (d) PHOTOGRAPHIC EQUIPMENT.—Demonstrate ability to care for and to make minor repairs to photographic equipment.
- (e) D-5208.11 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) AERIAL MAPPING.—Have a thorough understanding of the fundamentals of aerial mapping.
- (b) D-5208.11 (1) (B).

(3) PHOTOGRAPHER'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to take charge of a photographic laboratory and direct subordinates in photographic work.
- (b) MOTION PICTURE CAMERAS.—Demonstrate ability to operate proficiently at least two service types of motion picture cameras.
- (c) COLOR FILM.—Demonstrate ability to process at least one type of mono-pack color film in service use.
- (d) D-5208.11 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) TECHNICAL BULLETINS.—Have a thorough knowledge of the contents of the *Photography Technical Bulletins* issued by the Bureau of Aeronautics.
- (b) MATERIEL.—Be thoroughly familiar with the procedure for procurement of photographic materiel.
- (c) D-5208.11 (2) (B).

(4) CHIEF PHOTOGRAPHER'S MATE.

(A) PRACTICAL FACTORS.

- (a) RECONNAISSANCE.—Demonstrate ability to plan completely, supervise, and execute an aerial photographic reconnaissance mission.
- (b) SUPERVISION AND INSTRUCTION.—Demonstrate ability to organize

and direct any naval photographic unit and be able to aid in the instruction of men under his supervision.

- (c) REPORTS.—Demonstrate ability to prepare a Quarterly Photographic Report.
- (d) D-5208.11 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) PHOTOGRAPHIC LABORATORY.—Know how to lay out a complete photographic laboratory for efficient operation. Have a comprehensive knowledge of all official publications bearing on the operation of naval photographic laboratory.
- (b) D-5208.11 (3) (B).

D-5208.12. Torpedoman's Mates V—(Aviation).

(1) TORPEDOMAN'S MATE V, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) TOOLS.—Demonstrate ability to use properly all hand tools, including special tools used in the maintenance of torpedoes of activity to which attached.
- (c) LUBRICATION.—Demonstrate ability to lubricate properly torpedoes in accordance with lubrication charts.
- (d) ASSEMBLY AND DISASSEMBLY.—Demonstrate ability to attach and remove the four major assemblies of a torpedo (head, air flask, afterbody, and tail).
- (e) MAINTENANCE.—Demonstrate ability to perform all upkeep routines on a ready or fully-ready torpedo, using an approved check-off list. Demonstrate ability to remove and reinstall the (1) immersion gear housing, (2) control valve, (3) starting gear, and (4) gyro. Demonstrate ability to disassemble all parts on engine bulkhead and remove and reinstall main engine. Demonstrate ability to disassemble and reinstall the water compartment bulkhead and the fuel compartment. Demonstrate ability to make tests of (1) check valves, (2) stop and charging valve, (3) fuel and water compartments, and (4) air flask.
- (f) AIR FLASK.—Demonstrate ability to charge or boost a torpedo air flask, observing all safety precautions.
- (g) DEPTH BOMBS.—Demonstrate ability to stow, handle, load, and prepare depth bombs for dropping.
- (h) WAR SHOT.—Demonstrate ability to prepare a torpedo for war shot, using approved check-off sheet.
- (i) LOADING.—Demonstrate ability to load aircraft munitions in aircraft.
- (j) BOMB-BAYS.—Demonstrate ability to rearrange bomb-bays to accommodate the various kinds of aircraft munitions.

(B) EXAMINATION SUBJECTS.

- (a) TORPEDOES.—General knowledge of torpedo construction and operation, including fuel, air, and water systems of the torpedoes assigned to activity to which attached.
- (b) MAINTENANCE AND RECOVERY.—Routine maintenance of torpedoes. Prefiring tests and post run treatment. Recovery of torpedoes, including special equipment used in recovery boat.
- (c) ELECTRICITY.—Elementary knowledge of electricity.
- (d) SAFETY PRECAUTIONS.—Safety precautions to be observed in stowage, handling, recovery, and firing of torpedoes, including warheads, boosters,

detonators, primers, impulse charges. Stowage and care of explosives, including sprinkling, flooding, lighting, and ventilating of magazines.

- (e) DEPTH BOMBS.—General knowledge of construction, operation, and maintenance of depth bombs. Safety precautions to be observed in stowage and handling of depth bombs.
- (f) ORDNANCE AND HANDLING EQUIPMENT.—Have a working knowledge of bombs, fuzes, bomb shackles, bomb and torpedo hoists, bomb and torpedo racks, torpedo stabilizers, and drag rings; and know the safety precautions involved.
- (g) D-5203.

(2) TORPEDOMAN'S MATE V, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) HAND TOOLS.—Demonstrate ability to perform emergency brazing, soldering, and sweating operations as required for torpedoes of activity to which attached.
- (b) BLUEPRINTS AND DRAWINGS.—Demonstrate ability to read blueprints, photoprints, and related ordnance drawings and descriptive sketches.
- (c) DEPTH BOMBS.—Demonstrate ability to superintend the complete overhaul, testing, and adjustment of a depth bomb for dropping.
- (d) D-5208.12 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MAINTENANCE.—Detailed knowledge of maintenance procedures for torpedoes. Knowledge of the treatment after run to prevent deterioration. Explain "ready condition" and "fully-ready condition."
- (b) RECORDS.—Present the torpedo logs and record sheets of activity to which attached.
- (c) TORPEDOES.—Detailed knowledge of the working of the component parts of an air torpedo and their regulation and adjustment.
- (d) ORDNANCE.—Know the construction, operation, and maintenance of warheads, depth charges, bombs, and mines, including exploders, boosters, pistols and detonators; and know the safety precautions involved.
- (e) SAFETY PRECAUTIONS.—Thorough and detailed knowledge of pertinent safety precautions covered in *U. S. Navy Regulations*, Chapter 24, Section 2.
- (f) D-5208.12 (1) (B).

(3) TORPEDOMAN'S MATE V, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) TORPEDOES.—Demonstrate ability to remove, overhaul, test, and reinstall:
(1) gyro; (2) depth gear; (3) housing; (4) reducing valve; (5) control valve; (6) check valve; (7) engine; (8) starting mechanism. Demonstrate ability to remove, disassemble, assemble, test, and install all mechanical types of torpedo exploder mechanisms, using approved check-off lists and observing all safety precautions.
- (b) MAINTENANCE.—Demonstrate ability to direct and supervise torpedo maintenance, including the preparation of required records.
- (c) D-5208.12 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) GYRO.—Thorough familiarity with the theory, care, adjustment, and balancing of the gyro of a torpedo.
- (b) DEPTH SETTINGS.—Knowledge of the depth settings to be used against various types of enemy warships.

- (c) EQUIPAGE.—Procedures for obtaining spare parts for torpedoes, and apparatus pertaining thereto. Knowledge of allowance lists.
- (d) ORDNANCE.—General knowledge of bombs, mines, demolition outfits, guns, pyrotechnics, and smoke-screen generators. Types of explosives, and stowage, handling and pertinent safety precautions; special upkeep and readiness procedures necessary under extreme climatic conditions.
- (e) D-5208.12 (2) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of an advanced course at an official torpedo school OR must have served at least six (6) months in a torpedo shop actually engaged in overhauling and servicing torpedoes.

(4) CHIEF TORPEDOMAN'S MATE V.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to supervise the work and training of lower ratings in the performance of all duties in connection with torpedoes.
- (b) D-5208.12 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) PUBLICATIONS.—Current regulations, orders, and instructions regarding torpedoes, as given in *U. S. Navy Regulations, Bureau of Ordnance Manual*, and other official publications.
- (b) SHIPMENT OF TORPEDOES.—Methods of preparing torpedoes for shipment.
- (c) DEMOLITION.—Demolition, including types of charge, and the method of placing for demolition at sea and on shore.
- (d) EXPLODER MECHANISMS.—Construction, operation, maintenance, and tests.
- (e) D-5208.12 (3) (B).

D-5208.13. Painters V—(Aircraft Painters).

(1) PAINTER V, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) SURFACE PREPARATION.—Demonstrate ability to prepare aircraft surfaces for painting. Be able to clean and strip surfaces and to use metal scrapers and steam hose properly.
- (c) PAINT PREPARATION.—Demonstrate ability to select, mix, match, thin, and strain paints, primers, and dopes.
- (d) EQUIPMENT.—Demonstrate ability to care for and use properly all painting equipment including spray guns and accessories, paint kettle, masks, and brushes.
- (e) SAFETY PRECAUTIONS.—Demonstrate ability to follow safety precautions in use of paint spray equipment and steam hose and in stowage of paints and paint removers. Be able to render first aid for accidents occurring in paint shops.
- (f) PAINTING.—Demonstrate ability to paint fuselage of aircraft. Be able to apply properly dope or lacquer to fabric parts of aircraft. Be able to touch up small spots on fuselage. Demonstrate ability to apply cement to portions of wings to be used as catwalks.
- (g) LETTERING AND FINISHING.—Demonstrate ability to put lettering and insignia on surfaces of aircraft. Demonstrate ability to finish wooden articles with stains, varnishes, enamels, and paints.

(B) EXAMINATION SUBJECTS.

- (a) **MATERIALS.**—Know the names, composition, and physical properties of paints, dope, varnishes, enamels, thinners, driers, and removers used in aircraft painting. Know the purposes for which used, procedures for mixing and thinning, and care after being opened, mixed, and partially used.
- (b) **EQUIPMENT.**—Have a working knowledge of the construction and principles of operation of spray guns, paint kettles, and steam hose equipment. Know the methods of lifting aircraft or parts of aircraft in order to paint underneath. Know the purpose and uses of masking tape.
- (c) **AIRCRAFT NOMENCLATURE AND HANDLING.**—Have a working knowledge of aircraft structure and nomenclature. Be familiar with the handling of airplanes both carrier and shore based. Know the effect of painting on efficiency of aircraft.
- (d) **REGULATIONS.**—Know the current regulations and instructions relating to stowage of paints, dope thinners, and removers. Know the fire hazards involved in the use of paints and removers.
- (e) **CAMOUFLAGE.**—Have an elementary knowledge of camouflage principles and techniques.
- (f) D-5203.

(2) PAINTER V, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) **FABRIC.**—Be able to make minor repairs to fabric covered skin surfaces, such as for X, L, and T shaped tears, small patches, and insert patches.
- (b) **PAINTING.**—Demonstrate ability to estimate paint required for a given job. Know the basic colors and how to mix and match colors. Know thoroughly the reason for and how to apply primers for oils and lacquer paints. Demonstrate thorough competence in applying paints, dope, and enamel to aircraft surfaces. Demonstrate ability to paint propellers.
- (c) **EQUIPMENT.**—Demonstrate ability to maintain and make minor repairs to all painting equipment including spray guns and accessories, paint kettles, and steam hose.
- (d) **PLYWOOD.**—Demonstrate ability to do routine treatment and repair work on aircraft plywood surfaces.
- (e) **FAIRING AND GLAZING.**—Be able to do fairing and glazing.
- (f) **LETTERING.**—Be able to do advanced lettering and insignia painting. Be able to apply decalcomanias.
- (g) D-5208.13 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) **CORROSION.**—Understand the causes and methods of prevention of corrosion of aircraft surfaces and structures. Know the dangers of scratching aluminum and the effect of oxidization on strength.
- (b) **MATERIALS.**—Know the different grits and how and when to use rubbing compound and quantities required. Know how to control dope blushing and the correct amount of dope to apply to fabric surface. Know the special protective coatings such as used on electric equipment.
- (c) **TECHNICAL INFORMATION.**—Be familiar with applicable portions of *General Manual for Structural Repair*. Be familiar with orders and technical notes relating to aviation painting.
- (d) **LACQUERS AND DOPES.**—Know the proper temperature and humidity requirements necessary for working with lacquers and dopes.
- (e) D-5208.13 (1) (B).

(3) PAINTER V, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) MASKING.—Be able to make layouts and patterns using masking tapes and layouts on the plane.
- (b) LACQUERS.—Demonstrate ability to use crackle lacquer and proper temperatures to be used. Understand the use of synthetic lacquer. Demonstrate thorough knowledge of nitro-cellulose dopes and lacquers and how to use them.
- (c) SUPERVISION.—Be able to train and supervise subordinates in the use of paints and other phases of aircraft painting. Be able to estimate equipment needed for a squadron shop.
- (d) PLYWOOD.—Be able to make all necessary repairs to aircraft plywood surfaces and to do all necessary treatment and finishing of such surfaces.
- (e) D-5208.13 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) PAINTS.—Know the drying times for the different types of paints. Be familiar with all special paints used around aircraft including acid resisting paint and rubber paint.
- (b) FIRE.—Know how to handle paint fires and type of equipment to use.
- (c) THEORY OF FLIGHT.—Know the basic principles of theory of flight.
- (d) CAMOUFLAGE.—Have a working knowledge of principles and techniques of camouflage.
- (e) D-5208.13 (2) (B).

(4) CHIEF PAINTER V.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to organize and direct the operations of the paint shop of an aircraft service squadron or unit. Be able to interpret and explain bulletins and technical notes issued for camouflaging and painting of aircraft.
- (b) D-5208.13 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) NAVAL ORGANIZATION.—Have a detailed knowledge of the naval aviation organization including all phases of squadron activity.
- (b) TECHNICAL INFORMATION.—Know where to find and how to use technical information regarding aircraft painting.
- (c) MATERIALS.—Know where and how to obtain material and spare parts for aircraft painting.
- (d) D-5208.13 (3) (B).

D-5208.14. Storekeepers V—(Aviation Storekeepers).

(1) STOREKEEPER V, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1) and (2) except (2) (b) which is not required of nonflying personnel.
- (b) TYPEWRITING.—Demonstrate ability to typewrite, using the touch system.
- (c) OFFICE MACHINES.—Demonstrate ability to operate an adding machine or a calculating machine.
- (d) PENMANSHIP.—Demonstrate ability to write or print legibly.
- (e) RECORDING.—Demonstrate ability to record numbers neatly and accurately.

- (f) IDENTIFICATION.—Be able to identify readily:
- (i) Standard aeronautical material.
 - (ii) Major airplane structural spare parts of common types of naval planes.
 - (iii) Engines, engine accessories, and spare parts.
 - (iv) Propellers, propeller accessories, and spare parts.
 - (v) Aeronautical instruments.
 - (vi) Pyrotechnics accessories and major assemblies of ordnance.
 - (vii) Major assemblies of radio equipment.
 - (viii) Airplane and pilot equipment such as parachutes, life rafts, life jackets, flight clothing, jungle kits, engine and cockpit covers, etc.
 - (ix) Common aviation tools.
- (g) CATALOGUES AND CHARTS.—Demonstrate ability to use properly the *Catalogue of Aeronautical Materials*, *Catalogue of Spare Parts and Equipment*, interchangeability charts, Bureau of Aeronautics and Bureau of Ordnance aviation allowance lists, and photographic catalogues.

(B) EXAMINATION SUBJECTS.

- (a) SPELLING.—Be able to spell words commonly used in all phases of supply and also the technical terms used in aviation activities.
- (b) PUBLICATIONS.—Know the names and uses of the principal publications used in the Supply Department, and also technical publications used in aviation supply.
- (c) FILING.—Have a working knowledge of the Navy filing system.
- (d) S AND A FORMS.—Know the uses of, and be able to prepare the S and A forms used in aviation supply, including invoices, public vouchers, stock cards, and requisitions.
- (e) STOWAGE.—Know the current instructions regarding the stowage of inflammables, acids, technical aeronautical items, and materials susceptible to rapid deterioration.
- (f) IDENTIFICATION.—Know in general how aeronautical stores and materiel are classified, marked, and measured.
- (g) STORES ISSUE.—Know how stores are issued on stub requisitions and how credit entries are made in ledgers.
- (h) ENLISTED PERSONNEL RECORDS.—Know the type and content of enlisted personnel records that are kept on board ship.
- (i) AERONAUTICAL RECORDS.—Have a knowledge of the uses and contents of the special records, pertaining to aeronautical supplies, kept in the Supply Department.
- (j) DISBURSING.—Know the ratings, pay grades, and current instructions regarding pay and allowances for enlisted personnel.
- (k) STOCK CLASSES.—Know the commonly used stock classes.
- (l) LOGS.—Have a thorough knowledge of the purpose of, and the correct way to use engine, propeller, plane, and other airplane log books.
- (m) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Be a graduate of a Class A Storekeeper School and an Aviation Storekeeper School, or have satisfied the commanding officer that the candidate has achieved a comparable degree of competence.

(2) STOREKEEPER V, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of thirty (30) words per minute, using the touch system.

- (b) OFFICE MACHINES.—Demonstrate ability to operate the commonly used calculating machines.
- (c) RECORD KEEPING.—Demonstrate ability to make accurate entries in the various Supply Department records.
- (d) IDENTIFICATION.—Demonstrate ability to identify readily major and minor structural airplane spare parts for all naval airplanes and all aviation tools.
- (e) AIRPLANE CHANGES.—Demonstrate ability to read and understand Bureau of Aeronautics *Airplane Changes and Engine Bulletins*.
- (f) D-5208.14 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Know the organization of a Supply Department and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the proper letter and memorandum forms for official correspondence.
- (c) PROCUREMENT.—Know how supplies and equipage are obtained; including the making of purchases.
- (d) ISSUANCE.—Know how to issue aeronautical items.
- (e) SURVEYS.—Know how surveys are made on board ship.
- (f) TITLES AND APPROPRIATIONS.—Know the meanings and uses of the various titles and appropriations.
- (g) STOWAGE.—Know the principles governing the stowage of materiel on board ship.
- (h) AIR SHIPMENT.—Know how to pack, crate, and ship air-borne cargo.
- (i) SAFETY PRECAUTIONS.—Know the safety precautions to be observed in moving or lifting heavy materiel and the care to be used in handling delicate equipment.
- (j) D-5208.14 (1) (B).

(3) STOREKEEPER V, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of forty (40) words per minute, using the touch system.
- (b) OFFICE MACHINES.—Demonstrate ability to use a calculating machine rapidly and accurately.
- (c) SUPERVISION.—Demonstrate ability to instruct and supervise subordinates in Supply Department aviation activities.
- (d) IDENTIFICATION.—Demonstrate ability to identify readily all materiel in aeronautical allowance lists including shop equipment, aerological, photographic, radio, and ordnance materiel.
- (e) D-5208.14 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) CORRESPONDENCE.—Know the regulations and instructions pertaining to the preparation, handling, and filing of official correspondence.
- (b) PUBLICATIONS.—Have a thorough knowledge of the publications used by the Supply Department afloat.
- (c) INVENTORY.—Know how to conduct an inventory of all aeronautical stores and make adjustments on records for gains and losses found by inventory.
- (d) STOCK CONTROL.—Know the methods of stock upkeep, control, and replenishment as contained in all aviation allowance lists and instructions.
- (e) REGULATIONS.—Know the regulations governing the issue of and accounting for all aeronautical materiel and be able to prepare the reports and returns required.

- (f) AERONAUTICAL LISTS.—Have a thorough understanding of aircraft engine interchangeability lists and allowance lists.
 - (g) CATALOGUES.—Have a thorough understanding of airplane photographic catalogues and erection and maintenance manuals for type aircraft.
 - (h) D-5208.14 (2) (B).
- (4) CHIEF STOREKEEPER V.
- (A) PRACTICAL FACTORS.
 - (a) SUPERVISION.—Demonstrate ability to take charge of any aviation Supply Department office or storage group.
 - (b) TRAINING.—Demonstrate ability to train subordinates in all phases of aviation supply.
 - (c) D-5208.14 (3) (A).
 - (B) EXAMINATION SUBJECTS.
 - (a) PROCEDURES.—Have a thorough knowledge of all Supply Department procedures afloat.
 - (b) STOCK CLASSES.—Know what materials are included under the general classes of naval and aeronautical materials listed in the *Federal Standard Stock Catalogue* and Aviation Supply Officer Replenishment Lists.
 - (c) MARKING AND IDENTIFICATION.—Know how naval and aeronautical materiel in storage is marked and, given certain markings, be able to identify them.
 - (d) STOWAGE AND PRESERVATION.—Know the principles of cargo stowage and preservation.
 - (e) PROCUREMENT.—Know the procedure for procuring materiel, including the use of letters and dispatches.
 - (f) INVENTORIES.—Know what inventories of aeronautical materiel and general stores are taken afloat and the proper method of taking them.
 - (g) ORGANIZATION.—Know the bureaus of the Navy Department, and know which departments on board ship have cognizance of materials classified under each title.
 - (h) RESTRICTIONS.—Know the restrictions imposed by law upon the procurement and expenditure of supplies and money under the direction of the Supply Department afloat.
 - (i) D-5208.14 (3) (B).

D-5209. SPECIAL BRANCH.

D-5209.01. Yeomen.

(1) YEOMAN, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) CLERICAL ABILITY.—Demonstrate a working knowledge of a ship's office routine by serving creditably as a yeoman striker for at least three months in a unit or activity of the Navy afloat or ashore.
- (c) TYPEWRITER CARE.—Demonstrate a practical knowledge of the routine care of the typewriter through proper oiling, cleaning, and the making of minor adjustments.
- (d) DUPLICATING MACHINE.—Demonstrate a working knowledge of an office duplicating machine.

(B) EXAMINATION SUBJECTS.

- (a) TYPEWRITING.—Typewrite for five (5) minutes at an average rate of not less than twenty (20) words a minute, with not more than five (5) errors.
- (b) FILING.—Working knowledge of the Navy filing system, including classifying, filing, and finding correspondence.
- (c) CORRESPONDENCE.—General knowledge of the forms and the routing of official correspondence. Thorough knowledge of the official letter form, including endorsements.
- (d) CLASSIFIED MATTER.—General knowledge of the regulations governing the classification, preparation, and handling of classified matter.
- (e) PUBLICATIONS.—Names and general arrangement of the standard Navy publications customarily used as references by yeomen.
- (f) ORGANIZATION.—General knowledge of the organization of the Navy ashore and afloat. Thorough knowledge of the organization and functions of the departments of the branch (i.e., ashore or afloat) in which the yeoman may be expected to serve.
- (g) COURTS AND BOARDS.—General knowledge of instructions relative to naval courts and boards, particularly the duties of a deck court recorder.
- (h) ENLISTED PERSONNEL ADMINISTRATION.—Working knowledge of the regulations, instructions, and office routine pertaining to enlistments, reenlistments, and extensions of enlistments; reports of enlisted personnel; service records; ratings, pay grades and changes in ratings; transfers; discipline; and separations from the service.
- (i) ENGLISH.—Good English usage, including punctuation, capitalization, quotation, syllabication, hyphenation, the formation of possessives, and authorized abbreviations.
- (j) SPELLING.—Spelling of commonly used words, including naval terms.
- (k) D-5203.

(2) YEOMAN, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) CLERICAL ABILITY.—Demonstrate a thorough familiarity with the current orders and instructions, files, records and forms, and routine in an office of a unit or activity of the Navy afloat or ashore.
- (b) D-5209.01 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) TYPEWRITING.—Typewrite for five (5) minutes at an average rate of not less than thirty (30) words a minute, with not more than five (5) errors.
- (b) CORRESPONDENCE.—Detailed knowledge of the regulations and instructions pertaining to the preparation and handling of all forms of official correspondence. An understanding of the meaning of "official channels" and "chain of command" in relation to correspondence.
- (c) COURTS AND BOARDS.—Thorough knowledge of the duties of a yeoman as a recorder for a deck court, and as a reporter for a summary court-martial.
- (d) PERSONNEL REPORTS.—Thorough knowledge of the records maintained and the reports required in enlisted personnel administration. Know how to prepare all the usual reports.
- (e) SERVICE RECORDS.—Thorough knowledge of the entries required in the enlisted service records. Know the instructions relative to discipline.
- (f) RATINGS AND PAY.—Know the names of the enlisted ratings, their abbreviations, and classification by pay grades; know in general the instructions regarding special qualifications and extra pay for enlisted personnel; know how changes in ratings are effected.

- (g) ENLISTMENTS AND SEPARATIONS.—Know the regulations and instructions, and be able to prepare the required papers in connection with enlistments, extensions of enlistments, reenlistments, discharges, and other separations.
- (h) TRANSFERS AND TRANSPORTATION.—Know the current instructions regarding transfers of enlisted personnel and the preparation of papers required; have a general knowledge of the instructions pertaining to travel and transportation, quarters and subsistence.
- (i) D-5209.01 (1) (B).

(3) YEOMAN, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) CLERICAL ABILITY.—Demonstrate ability to supervise and instruct subordinates in an office of a unit or activity of the Navy afloat or ashore.
- (b) CORRESPONDENCE.—Demonstrate ability to prepare routine letters on own initiative or from a brief oral or written outline of the subject matter.
- (c) D-5209.01 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) TYPEWRITING.—Typewrite for five (5) minutes at an average rate of not less than forty (40) words a minute, with not more than five (5) errors.
- (b) STENOGRAPHY.—Take dictation for five (5) minutes at an average rate of not less than sixty (60) words a minute. Transcribe at an average rate of not less than twenty (20) words a minute, with not more than ten (10) errors, the material taken in the dictation.
- (c) PUBLICATIONS.—Thorough knowledge of official publications used as references in naval offices, and the sources and methods of procuring them.
- (d) CLASSIFIED MATTER.—Thorough knowledge of the regulations governing the classification, preparation, and safeguarding of classified matter.
- (e) REPORTS.—Thorough knowledge of all routine and special reports required of a ship or a shore station, and of the sources of information needed for those reports.
- (f) ORGANIZATION.—Thorough knowledge of ship's regulations (or station's regulations), the organization for administration and battle, and the preparation of watch, quarter, and station bills.
- (g) COURTS AND BOARDS.—Know the duties of a yeoman in connection with a court-martial, a court of inquiry, a board of investigation, a board of inquest, and an examining board.
- (h) OFFICER PERSONNEL ADMINISTRATION.—Thorough knowledge of the records and reports pertaining to officer personnel, including training and special provisions for the Naval Reserve.
- (i) ENLISTED PERSONNEL ADMINISTRATION.—Knowledge of the regulations, instructions, and office routine pertaining to training, promotions, and appointments to warrant and commissioned rank, and special provisions for the Naval Reserve.
- (j) D-5209.01 (2) (B).

(4) CHIEF YEOMAN.

(A) PRACTICAL FACTORS.

- (a) ADMINISTRATIVE ABILITY.—Demonstrate the ability to organize and take charge of a major office in a unit or activity of the Navy afloat or ashore.
- (b) D-5209.01 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) STENOGRAPHY.—Take dictation for five (5) minutes at an average rate of

not less than eighty (80) words a minute. Transcribe at an average rate of not less than twenty (20) words a minute, with not more than ten (10) errors, the material taken in the dictation.

- (b) **CORRESPONDENCE.**—Knowledge of social correspondence of an official nature, including formal invitations and formal notes of acceptance or regret.
- (c) **PERSONNEL ADMINISTRATION.**—Thorough knowledge of the regulations and instructions pertaining to the administration of personnel, officer and enlisted, regular and reserve, as contained in the *Bureau of Naval Personnel Manual*, *U. S. Navy Regulations*, and current instructions.
- (d) **COURTS AND BOARDS.**—Thorough familiarity with instructions relating to discipline, and the preparation of papers required in the proceedings of all types of courts and boards.
- (e) **BENEFITS.**—Knowledge of the benefits available to naval personnel and the procedures for obtaining those benefits.
- (f) **PAY AND ALLOWANCES.**—Working knowledge of the regulations relating to pay and allowances, including transportation, quarters, subsistence, and the special provisions for temporary and detached duty.
- (g) **ORGANIZATION.**—Thorough knowledge of the organization of the Navy. Knowledge of the preparation of operation orders and movement orders.
- (h) D-5209.01 (3) (B).

(5) **INSTRUCTIONS FOR TESTS IN TYPEWRITING AND STENOGRAPHY**

NOTE.—Tests in typewriting and stenography should be given under conditions as nearly similar to working conditions as possible. The following rules are designed to provide examinations which are fair to the candidate as well as to the service.

(A) **TYPEWRITING.**

- (a) **COPY MATERIAL.**—Use unfamiliar, nontechnical material containing approximately five numerals per hundred words. The material to be copied should be single-spaced and legibly printed or typewritten in type approximately the size of pica or elite typewriter type.

(b) **TYPEWRITING RULES.**

- (i) Touch typewriting is required.
- (ii) The test period shall be five (5) minutes in length. Allow the candidate a short practice period preceding the test.
- (iii) Use 8 by 10½ inch plain paper. Set marginal stops for a line of sixty-five spaces and set machine for double-spacing.
- (iv) Erasures and blanking or “x’ing” out of characters are not permitted.

(c) **ERRORS.**

- (i) Each character transposed, omitted, or inserted, and each word misspelled, incorrectly syllabicated, or in any other way different from the original copy is an error.
- (ii) Only one error may be charged in any one word. An error in punctuation or spacing is considered an error in the preceding word.
- (iii) “Crowding” or “piling” of letters, strike-overs, and faulty shifting are considered errors. Improper indentation is counted in addition to other errors in the line.

(d) **GRADING.**

- (i) **WORDS A MINUTE.**—Five (5) strokes, counting spaces within the line as well as characters, make a “word” for grading typewriting tests. Divide the total number of strokes by five to determine the number of “words” written and divide this number by five, the number of minutes allowed for the test, to find “words a minute.” Round off the quotient to the nearest whole number.

- (ii) **MARKS.**—Anyone who either (1) fails to meet the minimum rate required or (2) makes more than five errors, regardless of speed attained, must be disqualified and given a mark of zero in typewriting. The mark for any speed and any number of errors shall be determined in accordance with Table I below.

(B) STENOGRAPHY.

- (a) **DICTATION MATERIAL.**—Use unfamiliar, nontechnical material. (In suitable material the words should average about $1\frac{1}{2}$ syllables.) As a guide to the dictator, mark material at quarter-minute intervals according to rate of dictation.

(b) **DICTATION RULES.**

- (i) Dictate continuously for five (5) minutes at the rate specified in the qualifications. Dictate a short practice paragraph preceding the test.
- (ii) Dictate the material only once; do not repeat any part.
- (iii) Call the paragraphs, but do not dictate punctuation marks or capitalization.

- (c) **SHORTHAND METHOD.**—The candidate must use a standard method of shorthand; that is, one constructed on a system of symbols and by means of which it has been demonstrated that a speed of 200 words a minute may be attained. Alphabetic systems are not acceptable. A machine for the purpose of dictation is acceptable when provided by the yeoman.

(d) **TRANSCRIPTION RULES.**

- (i) The transcription period shall begin immediately after the completion of dictation and shall include any time spent reading notes before transcribing them. Allow a maximum of twenty (20) minutes for transcription, but record completion time for each candidate finishing earlier.
- (ii) The use of an English dictionary is permitted during transcription.
- (iii) The transcript shall be typewritten, double spaced.

(e) **GRADING.**

- (i) **SHORTHAND NOTES.**—Collect shorthand notes and inspect them to see that a standard method of stenography has been used.
- (ii) **TRANSCRIPTION RATE.**—Divide the total number of words transcribed by the time in minutes, measured to the nearest quarter-minute, required for completion of the transcript. Round off the quotient to the nearest whole number.

(iii) **ERRORS.**

- (a) Any modification from the dictated material which changes the meaning or impairs the English is an error.
 - (b) Specific errors include: words omitted; inserted, repeated, or transposed; misspelled words; unauthorized abbreviations; changes in tense of verbs; changes in number, as from singular to plural; and typewriting errors. Deviations from the punctuation and capitalization of the dictated copy are permissible if they conform to accepted usage; however, serious mistakes, such as failure to place a period at the end of a sentence, to capitalize the first letter in a sentence, or to syllabicate properly are considered errors.
 - (c) An erasure is not an error if it is neatly done.
 - (d) Only one (1) error may be charged to any one word.
- (iv) **MARKS.**—Anyone who either (1) fails to meet the minimum rate of transcription, or (2) makes more than the maximum number of errors

allowed, regardless of rate attained, must be disqualified and given a mark of zero in stenography. The mark for any speed and any number of errors shall be determined in accordance with Table II below.

(C) MARKS FOR TESTS IN TYPEWRITING AND TRANSCRIPTION.

TABLE I. TYPEWRITING

RATE OF SPEED	NUMBER OF ERRORS						
	6 or more	5	4	3	2	1	0
Below qualifying rate.....	0	0	0	0	0	0	0
Qualifying rate.....	0	2.5	2.7	2.9	3.1	3.3	3.5
Plus 1-2 words a minute.....	0	2.6	2.8	3.0	3.2	3.4	3.6
Plus 3-4 " " " ".....	0	2.7	2.9	3.1	3.3	3.5	3.7
Plus 5-6 " " " ".....	0	2.8	3.0	3.2	3.4	3.6	3.8
Plus 7-8 " " " ".....	0	2.9	3.1	3.3	3.5	3.7	3.9
Plus 9 or more words a min....	0	3.0	3.2	3.4	3.6	3.8	4.0

TABLE II. TRANSCRIPTION

RATE OF SPEED	NUMBER OF ERRORS						
	11 or more	9-10	7-8	5-6	3-4	1-2	0
Below qualifying rate.....	0	0	0	0	0	0	0
Qualifying rate.....	0	2.5	2.7	2.9	3.1	3.3	3.5
Plus 1 word a minute.....	0	2.6	2.8	3.0	3.2	3.4	3.6
Plus 2 words a minute.....	0	2.7	2.9	3.1	3.3	3.5	3.7
Plus 3 " " " ".....	0	2.8	3.0	3.2	3.4	3.6	3.8
Plus 4 " " " ".....	0	2.9	3.1	3.3	3.5	3.7	3.9
Plus 5 or more words a min....	0	3.0	3.2	3.4	3.6	3.8	4.0

EXAMPLES.

TABLE I. *Typewriting*. A candidate for yeoman, third class, typewrites 24 words a minute with 3 errors. This rate of speed is the qualifying rate (20 words) a minute plus 4. Therefore, follow the "3-4" line across to the column for three errors in typewriting to determine the mark, which is 3.1.

TABLE II. *Transcription*. A candidate for yeoman, first class, transcribes at a rate of 26 words a minute, which is "5 or more" words a minute above the qualifying rate of 20 words a minute. He makes 8 errors. Therefore, his mark is 3.2.

D-5209.02. Storekeepers.

(1) STOREKEEPER, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) TYPEWRITING.—Demonstrate ability to typewrite using the touch system.
- (c) OFFICE MACHINES.—Demonstrate ability to operate an adding machine or a calculating machine.
- (d) PENMANSHIP.—Demonstrate ability to write or print legibly.
- (e) RECORDING.—Demonstrate ability to record numbers neatly and accurately.

(B) EXAMINATION SUBJECTS.

- (a) SPELLING.—Be able to spell words commonly used in all phases of the Supply Department activities, including trade and standard stock names.
- (b) PUBLICATIONS.—Know the names and uses of the principal publications used in the Supply Department.
- (c) FILING.—Have a working knowledge of the Navy filing system.
- (d) S AND A FORMS.—Know the uses of, and be able to prepare the S and A forms, including invoices, public vouchers, stock cards, and requisitions.
- (e) STOWAGE.—Know the current instructions regarding the stowage of inflammables, acids, and materials susceptible to rapid deterioration.
- (f) IDENTIFICATION.—Know in general how naval stores and materiel are classified, marked, and measured.
- (g) STORES ISSUE.—Know how stores are issued on stub requisitions and how credit entries are made in ledgers.
- (h) ENLISTED PERSONNEL RECORDS.—Know the type and content of enlisted personnel records that are kept on board ship.
- (i) TITLES AND APPROPRIATIONS.—Have an elementary knowledge of the titles and appropriations.
- (j) DISBURSING.—Know the ratings and pay grades for enlisted personnel and the ranks and pay periods for officer personnel. Know the current instructions regarding allowances for enlisted personnel and for officer personnel.
- (k) SMALL STORES AND SHIP'S STORE.—Know where to find current regulations and instructions governing the operation of a ship's store and the issue and accounting for clothing and small stores.
- (l) STOCK CLASSES.—Know the commonly used stock classes.
- (m) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Be a graduate of a Class A Storekeeper School, or have satisfied the commanding officer that the candidate has achieved a comparable degree of competence.

(2) STOREKEEPER, SECOND CLASS.**(A) PRACTICAL FACTORS.**

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of thirty (30) words per minute using the touch system.
- (b) OFFICE MACHINES.—Demonstrate the ability to operate the commonly used calculating machines.
- (c) RECORD KEEPING.—Demonstrate ability to make accurate entries in the various Supply Department records.
- (d) STOWAGE.—Demonstrate ability to stow properly all materiel.
- (e) D-5209.02 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Have a general knowledge of the organization of a Supply Department afloat and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the proper letter and memorandum forms for official correspondence.
- (c) PROCUREMENT.—Know how supplies and equipment are obtained, including the making of purchases afloat.
- (d) DISBURSING.—Know in general how to open, maintain, transfer, and close a pay record, and to prepare a money list and a Navy pay roll. Have a general knowledge of the purposes, amounts and registration of allotments and family allowances.

- (e) SURVEYS.—Know the purpose of surveys and how they are made.
- (f) SMALL STORES AND SHIP'S STORE.—Know the method of issuing clothing and small stores to a crew, and know the current instructions and regulations for the administration of a ship's store.
- (g) STOWAGE.—Know the principles governing the stowage of materiel on board ship.
- (h) IDENTIFICATION.—Know in detail how naval stores and materiel are classified, marked, and measured.
- (i) TITLES AND APPROPRIATIONS.—Know the meanings and uses of the various titles and appropriations.
- (j) SAFETY PRECAUTIONS.—Know the safety precautions to be observed in moving or lifting heavy materiel.
- (k) D-5209.02 (1) (B).

(3) STOREKEEPER, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of forty (40) words per minute using the touch system.
- (b) OFFICE MACHINES.—Demonstrate ability to use a calculating machine rapidly and accurately.
- (c) SUPERVISION.—Demonstrate ability to instruct and supervise subordinates in Supply Department activities.
- (d) D-5209.02 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Have a thorough knowledge of the organization and administration of a Supply Department, and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the regulations and instructions pertaining to the preparation, handling, and filing of official correspondence.
- (c) PUBLICATIONS.—Have a thorough knowledge of all publications used by the Supply Department.
- (d) INVENTORY.—Know how to conduct an inventory of stores and materiel, and to make adjustments for gains and losses found by inventory.
- (e) STOCK CONTROL.—Know the methods of stock upkeep, control, and replenishment.
- (f) RECORDS AND RETURNS.—Know how to keep records and make the proper returns for clothing and small stores, ship's store and provisions.
- (g) DISBURSING.—Know how to handle separations, including discharge, death, and desertions. Have a thorough knowledge of current travel instructions.
- (h) D-5209.02 (2) (B).

(4) CHIEF STOREKEEPER.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to take charge of a Supply Department office.
- (b) TRAINING.—Demonstrate ability to train subordinates in all phases of Supply Department activities.
- (c) D-5209.02 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Know the bureaus of the Navy Department, and the departments on board ship. Know the bureaus and departments that have cognizance of materials classified under each title.

- (b) PROCEDURES.—Have a thorough knowledge of procedures in the Supply Department afloat.
- (c) STOWAGE AND PRESERVATION.—Have a thorough knowledge of the principles of cargo stowage for various types of materials and the principles of preservation of provisions.
- (d) STOCK CONTROL.—Know thoroughly the principles and methods of control of naval stores and supplies, including: naval systems of stock classes, marking and identification, replenishment of supplies, records and reports, and inventories.
- (e) PROCUREMENT.—Know the method of procuring special materiel by letter or dispatch.
- (f) RESTRICTIONS.—Know the restrictions imposed by law upon the procurement and expenditure of supplies and money under the direction of the Supply Department afloat.
- (g) D-5209.02 (3) (B).

D-5209.021. Storekeepers D—(Disbursing Storekeepers).

(1) STOREKEEPER D, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) TYPEWRITING.—Demonstrate ability to typewrite using the touch system.
- (c) OFFICE MACHINES.—Demonstrate ability to operate an adding machine or a calculating machine.
- (d) PENMANSHIP.—Demonstrate ability to write or print legibly.
- (e) RECORDING.—Demonstrate ability to record numbers neatly and accurately.

(B) EXAMINATION SUBJECTS.

- (a) SPELLING.—Be able to spell words commonly used in all phases of supply and disbursing activities.
- (b) PUBLICATIONS.—Know the names and uses of the principal publications used in the Supply Department.
- (c) FILING.—Have a working knowledge of the Navy filing system.
- (d) S AND A FORMS.—Know the uses of, and be able to prepare the S and A forms used on board ship, including authorization of allotment, Navy pay records, Navy pay roll, and Navy pay roll money list.
- (e) STOWAGE.—Know the current instructions regarding the stowage of inflammables, acids, technical items, and materials susceptible to rapid deterioration.
- (f) IDENTIFICATION.—Know in general how naval stores and materiel are classified, marked, and measured.
- (g) STORES ISSUE.—Know how stores are issued on stub requisitions and how credit entries are made in ledgers.
- (h) ENLISTED PERSONNEL RECORDS.—Know the type and content of enlisted personnel records that are kept on board ship.
- (i) TITLES AND APPROPRIATIONS.—Have an elementary knowledge of the titles and appropriations.
- (j) DISBURSING.—Know the ratings and pay grades for enlisted personnel and the ranks and pay periods for officer personnel. Know the current instructions regarding allowances for enlisted personnel and for officer personnel. Understand the basic principles of pay roll accounting.
- (k) STOCK CLASSES.—Know the commonly used stock classes.
- (l) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Be a graduate of a Class A Storekeeper School, or have satisfied the commanding officer that the candidate has achieved a comparable degree of competence.

(2) STOREKEEPER D, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of thirty (30) words per minute using the touch system.
- (b) OFFICE MACHINES.—Demonstrate ability to operate the commonly used calculating machines.
- (c) RECORD KEEPING.—Demonstrate ability to make accurate entries in pay and disbursing records.
- (d) D-5209.021 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Have a general knowledge of the organization of a disbursing office afloat and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the proper letter and memorandum forms for official correspondence.
- (c) DISBURSING.
 - (i) Know how to open, maintain, transfer, and close a pay record, including a pay record of a straggler or a deserter.
 - (ii) Know how to prepare a money list and a Navy pay roll.
 - (iii) Know the proper purposes and correct amounts for which allotments of pay may be made and how they are registered.
 - (iv) Know the requirements for family allowances.
 - (v) Know how to use *U. S. Navy Travel Instructions*.
- (d) PUBLIC VOUCHERS.—Know the regulations covering the preparation, certification, and auditing of public vouchers.
- (e) D-5209.021 (1) (B).

(3) STOREKEEPER D, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) TYPEWRITING.—Demonstrate ability to typewrite at a rate of forty (40) words per minute using the touch system.
- (b) OFFICE MACHINES.—Demonstrate ability to use a calculating machine rapidly and accurately.
- (c) SUPERVISION.—Demonstrate ability to instruct and supervise subordinates in disbursing office activities.
- (d) D-5209.021 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Have a thorough knowledge of the organization and administration of a disbursing office, and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the regulations and instructions pertaining to the preparation, handling, and filing of official correspondence.
- (c) PUBLICATIONS.—Have a thorough knowledge of all publications used by the disbursing office afloat.
- (d) DISBURSING.
 - (i) Know the current instructions regarding the issuance of transportation, and meal tickets or cash advances, and instructions regarding trans-

portation claims, including mileage, transportation of dependents, and claims for shipment of household effects.

(ii) Know how to handle separations including discharge, death, retirement, and desertion.

(iii) Know the benefits available generally to naval personnel, including insurance, pensions, and death and disability benefits.

(e) RECORDS AND RETURNS.—Know how to keep the disbursing records and make the proper disbursing returns in accordance with current laws and regulations.

(f) PAY ACCOUNTS.—Know how to open a temporary casualty and a temporary general pay record and the basis on which adjustments are subsequently made.

(g) D-5209.021 (2) (A).

(4) CHIEF STOREKEEPER D.

(A) PRACTICAL FACTORS.

(a) SUPERVISION.—Demonstrate ability to take charge of a disbursing office.

(b) TRAINING.—Demonstrate ability to train subordinates in all phases of disbursing procedures.

(c) D-5209.021 (3) (A).

(B) EXAMINATION SUBJECTS.

(a) DISBURSING.—Have a thorough knowledge of all disbursing procedures afloat including a thorough knowledge of the responsibilities of the disbursing officer as detailed by *U. S. Navy Regulations*.

(b) D-5209.021 (3) (B).

D-5209.022. Storekeepers T—(Technical Storekeepers).

(1) STOREKEEPER T, THIRD CLASS.

(A) PRACTICAL FACTORS.

(a) D-5204 (1).

(b) TYPEWRITING.—Demonstrate ability to typewrite, using the touch system.

(c) ADDING MACHINE.—Demonstrate ability to use an adding machine.

(d) PENMANSHIP.—Demonstrate ability to write or print legibly.

(e) RECORDING.—Demonstrate ability to record numbers neatly and accurately.

(f) IDENTIFICATION.—Demonstrate ability to identify readily equipments and major spare parts commonly found at a Spare Parts Distribution Center or electronics supply activity.

(B) EXAMINATION SUBJECTS.

(a) SPELLING.—Be able to spell words commonly used in all phases of supply and also the technical terms used in a Spare Parts Distribution Center (S.P.D.C.) or electronics supply activity.

(b) PUBLICATIONS.—Know the uses of the *Supplies and Accounts Manual*, *Supplies and Accounts Memoranda* and typical manufacturers' parts books or electronic equipment instruction books.

(c) FILING.—Have a working knowledge of the Navy filing system.

(d) S AND A FORMS.—Know the uses of, and be able to prepare the S and A forms commonly used at a S.P.D.C. or in the handling of electronics stores.

(e) STOWAGE.—Know the current instructions regarding the stowage of inflammables, acids, technical items, and materials susceptible to rapid deterioration.

- (f) IDENTIFICATION.—Know in general how technical stores and materiel are classified, marked, and measured, and understand the nomenclature and definitions applicable thereto.
- (g) STORES ISSUE.—Know how requisitions are prepared, how stores are issued on requisitions, and how credit entries are made on stock cards.
- (h) RECORDS.—Know the use and contents of the stock card file, shipping schedule, and other records usually kept at a S.P.D.C. or electronics supply activity.
- (i) PACKING.—Know the principles of packing and marking for shipment.
- (j) STOCK CLASSES.—Know the commonly used stock classes.
- (k) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Satisfactorily complete the basic storekeeper course at a Class A school and the course at a training school for technical storekeepers, or satisfy the commanding officer that the candidate has achieved a comparable degree of competence.

(2) STOREKEEPER T, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) RECORD KEEPING.—Demonstrate ability to make accurate entries in the various Supply Department records.
- (b) IDENTIFICATION.—Demonstrate ability to identify readily special tools, minor spare parts, accessories, and instruments usually carried in stock at a S.P.D.C., or in electronics stores.
- (c) STOWAGE.—Demonstrate ability to stow properly all materiel.
- (d) HANDLING.—Demonstrate ability to operate correctly materiel handling equipment.
- (e) D-5209.022 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Know the organization of a typical S.P.D.C. or electronics supply activity and the duties and responsibilities of the personnel attached thereto.
- (b) CORRESPONDENCE.—Know the proper letter and memorandum forms for official correspondence.
- (c) PROCUREMENT.—Have a general knowledge of the methods of procurement used at a S.P.D.C. or electronics supply activity.
- (d) ISSUANCE.—Know how to issue S.P.D.C. or electronics stock items.
- (e) SURVEYS.—Have a knowledge of the supply procedures employed in the salvage and reclamation of worn and damaged technical materiel.
- (f) SHIPPING AND RECEIVING.—Know the procedures to be followed and forms to be filled out when materiel is shipped or received.
- (g) SAFETY PRECAUTIONS.—Know the safety precautions to be observed in moving or lifting heavy materiel, and the care to be used in handling delicate instruments.
- (h) D-5209.022 (1) (B).

(3) STOREKEEPER T, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to instruct and supervise subordinates in S.P.D.C. or electronics supply activities.
- (b) IDENTIFICATION.—Demonstrate ability to identify readily all types of materiel stocked at an S.P.D.C. or electronics supply activity.
- (c) D-5209.022 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORGANIZATION.—Be thoroughly familiar with the organization of a S.P.D.C. or electronics supply activity and their relationship to other activities.
- (b) CORRESPONDENCE.—Know the regulations and instructions pertaining to the preparation, handling, and filing of official correspondence.
- (c) PUBLICATIONS.—Have a thorough knowledge of basic Supply Department publications and technical publications used by a S.P.D.C. or electronics supply activity.
- (d) INVENTORY.—Know how to conduct an inventory of all stores and make adjustments on records for gains and losses found by inventory.
- (e) STOCK CONTROL.—Know the methods of stock upkeep, control, and replenishment as employed in a S.P.D.C. or electronics supply activity.
- (f) REGULATIONS.—Know the local regulations governing the issue of and accounting for all materiel and be able to prepare the reports and returns required.
- (g) D-5209.022 (2) (B).

(4) CHIEF STOREKEEPER T.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to take charge of a unit of a S.P.D.C. or electronics supply activity.
- (b) TRAINING.—Demonstrate ability to train subordinates in all phases of S.P.D.C. supply or electronics supply activities.
- (c) D-5209.022 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) PROCEDURES.—Have a thorough knowledge of all S.P.D.C. supply or electronics supply procedures.
- (b) STOCK CLASSES.—Know what materials are included under the general classes of naval materials listed in the *Federal Standard Stock Catalogue* and special replenishment lists.
- (c) MARKING AND IDENTIFICATION.—Know how technical materiel in storage is marked and be able to identify each.
- (d) PRESERVATION.—Know the methods of preserving S.P.D.C. or electronics supply stock materiel.
- (e) PROCUREMENT.—Know the procedures for procuring S.P.D.C. or electronics supply materiel, including the use of letters and dispatches.
- (f) INVENTORIES.—Know what inventories of technical materiel are taken at a S.P.D.C. or electronics supply activity, and the proper method of taking them.
- (g) D-5209.022 (3) (B).

D-5209.03. Printers.

(1) PRINTER, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) COPY PREPARATION.—Demonstrate ability to read copy and to interpret proof reader's marks.
- (c) COMPOSITION.—Demonstrate ability to hand set and distribute type, read galley proofs, and make corrections on proof.
- (d) PRESSWORK.—Demonstrate ability to operate a hand feed jobber.
- (e) BINDERY.—Demonstrate ability to perform all hand operations in the bindery, such as trimming, collating, punching, and stitching.

- (f) PAPER.—Demonstrate ability to distinguish between paper types and grades.
- (g) MAINTENANCE.—Demonstrate ability to lubricate and clean printshop equipment.

(B) EXAMINATION SUBJECTS.

- (a) TYPESETTING.—Describe the commonly used type faces and know the principles of hand typesetting.
- (b) MAKE-UP.—Know the principles of locking forms and the fundamentals of make-up.
- (c) SPELLING AND PUNCTUATION.—Thorough knowledge of spelling and punctuation.
- (d) SAFETY PRECAUTIONS.—Know the safety precautions to be observed while working with and around printshop machinery on board ship or at a shore station.
- (e) PAPER HANDLING.—Knowledge of proper methods of paper handling, including paper cutting, stapling, punching, and folding.
- (f) PROOF READER'S MARKS.—Know the proof reader's marks commonly used in printing.
- (g) D-5203.

(2) PRINTER, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) COPY PREPARATION.—Demonstrate ability to mark up copy for composition.
- (b) COMPOSITION.—Demonstrate ability to make up single page forms, lock up, and impose them for a single color press.
- (c) PRESSWORK.—Demonstrate ability to operate a single color mechanical feed jobber.
- (d) BINDERY.—Demonstrate ability to operate all machines in the bindery, such as trimmers, collators, punches, and stitchers.
- (e) PAPER.—Demonstrate ability to cut paper economically from large sheets of stock.
- (f) MAINTENANCE.—Demonstrate ability to lubricate, clean, and make simple repairs and adjustments to printshop equipment.
- (g) D-5209.03 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MARKING COPY.—Know printer's proof marks and how to mark copy.
- (b) PROOF.—Know how to read proof and make corrections.
- (c) MAKE-UP.—Know the operations involved in the page imposition or make-up of a book or pamphlet.
- (d) D-5209.03 (1) (B).

(3) PRINTER, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) COMPOSITION.—Demonstrate ability to operate a linotype or monotype machine; to lock up and register a multi-color form; and to make page imposition for a book or pamphlet.
- (b) PRESSWORK.—Demonstrate ability to operate a small multi-color automatic press.
- (c) SUPERVISION.—Demonstrate ability to train and supervise subordinates in printing duties.
- (d) BINDERY.—Demonstrate ability to supervise bindery operations and to check page imposition for folding.

- (e) **PAPER.**—Demonstrate ability to determine proper economical layouts for cutting paper.
- (f) **ADJUSTMENT AND REPAIRS.**—Demonstrate ability to adjust and repair printshop equipment on board ship or at shore stations.
- (g) **BILLS OF MATERIAL.**—Demonstrate ability to make up bills of material and to estimate time and cost for printing jobs.
- (h) D-5209.03 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) **TYPE.**—Know the different type families and the general application of each to conform to subject matter and layout.
- (b) **IMPOSITION.**—Know how to supervise imposition for press and bindery and color registration.
- (c) **INKS.**—Know the properties of printing inks and how to mix them for use on a printing press.
- (d) **PAPERS.**—Know the characteristics of the standard papers used in the Navy and the proper uses of each kind.
- (e) D-5209.03 (2) (B).

(4) CHIEF PRINTER.

(A) PRACTICAL FACTORS.

- (a) **SUPERVISION.**—Demonstrate ability to organize and direct the work and training of subordinates.
- (b) **COPY PREPARATION.**—Demonstrate ability to advise others pertaining to copy preparation in relation to printing.
- (c) **COMPOSITION AND STONE.**—Demonstrate ability to mark up copy and prepare copy for composition. Demonstrate ability to check and approve proofs and color registration, and to check imposition for press and bindery.
- (d) **PRESSWORK.**—Demonstrate ability to prepare layouts for press and check presswork.
- (e) D-5209.03 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) **ENGRAVING AND ELECTROTYPING.**—Knowledge of engraving and electrotyping.
- (b) **PRESS OPERATION.**—Knowledge of cylinder press operation.
- (c) **ESTIMATING.**—Thorough and detailed knowledge of estimating and printing costs.
- (d) D-5209.03 (3) (B).

D-5209.031. Printers L—(Lithographers).

NOTE.—Printers L are assigned to the specialized press and transfer functions incident to the operation of offset lithographic presses designed for commercial-scale reproduction. This rating is restricted to the complements of larger shore and ship-board offset lithographic establishments wherein the precision nature of work requires a high degree of specialization.

In the qualifications outlined below, candidates for printer L shall meet the requirements for either *press operators* or *transfer personnel*, but not both, since the nature of such specialties normally precludes their combination.

(1) PRINTER L, THIRD CLASS.

(A) PRACTICAL FACTORS.

For press operators only:

- (a) D-5204 (1).

- (b) OPERATION.—Demonstrate ability as a press helper on a single or multi-color lithographic press.
- (c) MAINTENANCE.—Demonstrate ability to maintain a lithographic press, including oiling, wiping down, cleaning, washing rollers, and operating wash-up machine.
- (d) PLATES.—Demonstrate ability to gum up and wash out lithographic plates.
- (e) SOLUTIONS.—Demonstrate ability to mix water fountain, etching, and gumming solutions.
- (f) PAPER.—Demonstrate ability to handle and stack paper stock.
- (g) REGISTERING.—Demonstrate ability to use auxiliary equipment necessary and incidental to the proper running and register of lithographic copies.
- (h) FEEDING AND DELIVERY.—Demonstrate ability to assist in the proper setting and maintenance of the feeder and delivery equipment of a lithographic press before, during, and after operation.

For transfer personnel only:

- (i) D-5204 (1).
- (j) CLEANING AND STORING PLATES.—Demonstrate ability in the proper cleaning and storage of lithographic plates.
- (k) TRANSFER OPERATIONS.—Demonstrate ability to work with lithographic plates, including mounting paper on metal or board for key sheet or blueline separation of colors; rolling up simple color plates; mixing chemicals and stock solutions for etching, counter-etching, and gumming; and assisting in making proofs and chalk offsets.

(B) EXAMINATION SUBJECTS.

For press operators only:

- (a) PRESS OPERATION.—Knowledge of the adjustments to be made before and during the operation of a lithographic press.

For press operators AND transfer personnel:

- (b) LITHOGRAPHIC PROCESS.—General knowledge of the lithographic process of reproduction.
- (c) INKS.—General knowledge of the characteristics of lithographic inks.
- (d) PLATE MAKING.—Describe the steps and operations involved in the making of lithographic plates by the photographic process.
- (e) PLATE MAINTENANCE.—Knowledge of the procedure used in rubbing up, restoring, and preserving a lithographic plate.
- (f) SAFETY PRECAUTIONS.—Thorough knowledge of safety precautions to be observed in the operation of equipments and the use of lithographic supplies.
- (g) D-5203.

(2) PRINTER I, SECOND CLASS.

(A) PRACTICAL FACTORS.

For press operators only:

- (a) OPERATION.—Demonstrate ability as a pressman in line and half-tone work on a single or multi-color lithographic press, taking full responsibility for the continued safe and efficient operation, maintenance, and care thereof.
- (b) MOUNTING AND ADJUSTING.—Demonstrate ability to mount, position, and adjust a lithographic plate, a blanket, ink rollers, and water rollers.
- (c) MEASUREMENTS.—Demonstrate ability to take accurate micrometer measurements of plate and blanket to determine the amount of underpacking for necessary pressure between the plate and blanket cylinders.
- (d) ADJUSTMENTS.—Demonstrate ability to make all operational adjustments to a lithographic press.

- (e) MIXING INKS.—Demonstrate ability to mix inks correctly for colors, using the correct and proper vehicles, driers, binders, and compounds.
- (f) PRESERVATION AND RESTORATION.—Demonstrate ability to rub up and perform comparable operations for the preservation and restoration of lithographic plates.
- (g) CORRECTIONS.—Demonstrate ability to retouch and make minor corrections on lithographic plates.
- (h) ROLLERS.—Demonstrate ability to cover water and damper rollers.
- (i) D-5209.031 (1) (A) (a)-(h).

For transfer personnel only:

- (j) PLATES.—Demonstrate ability to work with lithographic plates, including the rolling up of plates for proof transfer, press, or storage; making proof or transfer impressions on transfer press or offset proving press; and making chalk offsets.
- (k) D-5209.031 (1) (A) (i)-(k).

(B) EXAMINATION SUBJECTS.

For press operators only:

- (a) PRESS OPERATION.—Knowledge of the work performed on a large single or multi-color lithographic press.
- (b) D-5209.031 (1) (B) (a).

For press operators AND transfer personnel:

- (c) CAMERA OPERATION.—Describe the steps and operations performed in making both a line and half-tone photographic negative.
- (d) QUALITY STANDARDS.—Knowledge of quality standards to be attained in lithographic press operation.
- (e) PRODUCTION STANDARDS.—Knowledge of production standards to be maintained in lithographic press operation.
- (f) D-5209.031 (1) (B) (b)-(g).

(3) PRINTER L, FIRST CLASS.

(A) PRACTICAL FACTORS.

For press operators only:

- (a) OPERATION.—Demonstrate ability as a pressman to run high quality, close register color work on a single or multi-color lithographic press, supervising press crew as required.
- (b) STANDARDS.—Demonstrate ability to judge production standards and standards of quality of the work of a particular crew.
- (c) BILLS OF MATERIAL.—Demonstrate ability to make up bills of materials required for the proper operation of a lithographic press.
- (d) PRODUCTION ESTIMATES.—Demonstrate ability to estimate production time and amount of materials involved in the operation of a press.
- (e) D-5209.031 (2) (A) (a)-(h).

For transfer personnel only:

- (f) PLATES.—Demonstrate ability to work with lithographic plates, including the inking and making of transfer impressions; making blueline prints for color separation; sticking up transfer impressions and making adjustment for register; making final transfer; rubbing up, rolling up, and performing other similar operations for the restoration of plates which are in poor condition; and performing proving operations which are of a difficult nature.

- (g) D-5209.031 (2) (A) (j).

(B) EXAMINATION SUBJECTS.

For press operators only:

- (a) D-5209.031 (2) (B) (a).

For press operators AND transfer personnel:

- (b) BINDERY AND FINISHING PROCESSES.—Detailed knowledge of the operations performed in the bindery and finishing processes.
- (c) PREPARATION OF PLATES.—Thorough knowledge of the operations performed in camera work and plate making.
- (d) PRESS OPERATION.—Thorough understanding of the possibilities and limitations of lithographic press work as determined by the design, construction, and adjustment of press to which assigned.
- (e) D-5209.031 (2) (B) (c)-(e).

(4) CHIEF PRINTER L.

(A) PRACTICAL FACTORS.

- (a) PERSONNEL.—Demonstrate ability to organize and supervise the work and training of personnel in the press room OR transfer room.
- (b) EQUIPMENT.—Demonstrate ability to supervise the installation, upkeep, and repair of equipment in the press room OR transfer room.
- (c) MATERIALS AND SUPPLIES.—Demonstrate ability to plan, requisition, store, distribute, and utilize materials and supplies required in lithographic press room OR transfer room.
- (d) STANDARDS.—Demonstrate ability to judge and maintain high standards in both the production and quality of lithographic work.
- (e) D-5209.031 (3) (A) (a)-(d) OR (f).

(B) EXAMINATION SUBJECTS.

- (a) LITHOGRAPHIC AND FINISHING PROCESSES.—Thorough knowledge of all operations performed in lithographing and finishing with emphasis upon the relationship of such operations to press room work OR transfer room work.
- (b) PLANT MANAGEMENT.—Thorough understanding of quality and production standards as related to efficient plant management.
- (c) D-5209.031 (3) (B) (b)-(d).

D-5209.032. Printers M—(Offset Process).

(1) PRINTER M, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) OPERATION.—Demonstrate ability to operate an offset duplicating machine.
- (c) OFFSET PROCESS.—Demonstrate skill in both the photographic and direct image offset processes and ability to operate auxiliary offset office duplicating equipment and machinery on board ship or at a naval shore establishment.

(B) EXAMINATION SUBJECTS.

- (a) SAFETY PRECAUTIONS.—Thorough knowledge of the safety precautions to be practiced when using offset machinery on board ship or at a shore station.
- (b) PHOTOGRAPHIC NEGATIVES.—Knowledge of the steps to be taken in opaquing and stripping negatives.
- (c) PLATE MAKING.—Thorough knowledge of the steps to be taken in offset plate making and plate preservation.

- (d) PAPER HANDLING.—Knowledge of proper methods of paper handling, including paper cutting, stapling, punching, and folding.
- (e) D-5203.

(2) PRINTER M, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) PREPARATION OF NEGATIVES.—Demonstrate ability to prepare line negatives, opaque and strip them, and make necessary corrections.
- (b) PREPARATION OF PLATES.—Demonstrate ability to make offset process plates.
- (c) EQUIPMENT.—Demonstrate ability to operate all offset equipment on board ship or at a shore station.
- (d) D-5209.032 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MARKING COPY.—Thorough knowledge of all printer's proof marks and how to mark copy.
- (b) MAKE-UP.—Thorough knowledge of the operations involved in the make-up of a book or pamphlet.
- (c) PHOTOGRAPHY.—Knowledge of offset photography and essentials of good copy for offset work.
- (d) D-5209.032 (1) (B).

(3) PRINTER M, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) FINAL COPY.—Demonstrate ability to prepare final offset copy from rough copy.
- (b) HALF-TONE NEGATIVES.—Demonstrate ability to make half-tone negatives.
- (c) ADJUSTMENT AND REPAIRS.—Demonstrate ability to adjust and repair offset machines and auxiliary offset machinery on board ship or at shore stations.
- (d) BILLS OF MATERIAL.—Demonstrate ability to make up bills of material and to estimate time and cost for offset jobs.
- (e) D-5209.032 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) INKS.—Knowledge of the properties of offset process inks and use of driers.
- (b) COLOR FILTERS.—Knowledge of color filters in photography.
- (c) PAPER.—Knowledge of the characteristics of the standard papers used in the Navy and the proper uses of each kind.
- (d) D-5209.032 (2) (B).

(4) CHIEF PRINTER M.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to supervise others in offset machine operation, plate making, and adjustment and repair.
- (b) TRAINING.—Demonstrate ability to train subordinates in the offset reproduction process.
- (c) ESTIMATION.—Demonstrate ability to estimate the cost and time elements of all styles of reproduction jobs.
- (d) COMPOSITION.—Demonstrate ability to advise as to the details of offset reproduction, imposition, layout, and composition.
- (e) D-5209.032 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) D-5209.032 (3) (B).

D-5209.041. Ship's Service Men B—(Barbers).

(1) SHIP'S SERVICE MAN B, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) BARBER SERVICES.—Demonstrate ability to cut hair and perform other essential barber services.
- (c) EQUIPMENT.—Demonstrate ability to use properly common barbering equipment.
- (d) MAINTENANCE OF EQUIPMENT.—Demonstrate ability to care for equipment in order to prevent rust and dulled edges; to recognize when equipment is dull or is not working properly; to sharpen tools; to make simple adjustments to clippers and other mechanical equipment, and to replace worn parts as necessary.
- (e) RECORDS.—Demonstrate ability to keep own records of customers served or chits collected.

(B) EXAMINATION SUBJECTS.

- (a) BARBER SHOP PRACTICES.—Know the regulations and practices governing the operation of the barber shops on own ship or station, including a knowledge of regulation haircuts.
- (b) SANITATION AND HYGIENE.—General knowledge of the principles and practices of barber shop sanitation and hygiene, including the clothing and personal hygiene of a barber, and the sterilization of barber equipment. Know and be able to recognize the common types of scalp and skin diseases so that such cases are not served, and know the procedures of referring personnel with such diseases to the medical officer.
- (c) SUPPLIES.—Know the types, characteristics; and uses of common barber supplies.
- (d) D-5203.

(2) SHIP'S SERVICE MAN B, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) BARBER SERVICES.—Demonstrate ability to perform sick bay barbering services.
- (b) EQUIPMENT.—Demonstrate proficiency in the use, care, minor repair, and adjustment of all barbering equipment.
- (c) RECORDS.—Demonstrate ability to assist in keeping shop records.
- (d) SHOP MANAGEMENT.—Demonstrate ability to operate a small shop (1 or 2 chairs) without close supervision or to act as assistant to the head barber in a large shop (approximately 6 or more chairs).
- (e) D-5209.041 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) SANITATION AND HYGIENE.—Have a detailed knowledge of sanitation and hygiene as they apply to a barber shop, sterilization of instruments, and the personal hygiene of the barber.
- (b) SUPPLIES.—Know the procedures in own shop for purchasing and accounting for supplies and equipment.
- (c) D-5209.041 (1) (B).

(3) SHIP'S SERVICE MAN B, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head barber in charge of a medium-sized barber shop (approximately 3 or 4 chairs) in a ship or station, having responsibility for organizing and supervising its clean and efficient operation.
- (b) SUPERVISION.—Demonstrate ability to instruct and supervise subordinate barbers in performing essential barber services.
- (c) EQUIPMENT.—Demonstrate ability to instruct and supervise subordinate barbers in the proper use, care, and the making of minor repairs and adjustments to barber shop equipment.
- (d) RECORDS.—Demonstrate ability, as required by own ship or station, to keep all shop records and make all required reports.
- (e) D-5209.041 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) BARBER SHOP PRACTICES.—Know how to prepare for the approval of the commanding officer supplementary instructions for own ship or station, including schedules and system of charges.
- (b) SANITATION AND HYGIENE.—Have a thorough knowledge of barber shop sanitation and hygiene and know the responsibilities of the head barber for maintaining a sanitary shop.
- (c) SUPPLIES AND EQUIPMENT.—Know thoroughly how to estimate supplies and equipment required and the procedures for purchasing and accounting for supplies and equipment.
- (d) D-5209.041 (2) (B).

(4) CHIEF SHIP'S SERVICE MAN B.

(A) PRACTICAL FACTORS.

- (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head barber in charge of a large barber shop (approximately 6 or more chairs) on a ship or station, having responsibility for organizing and supervising its clean and efficient operation.
- (b) D-5209.041 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) BARBER SHOP LAYOUT.—Knowledge of the layout of a barber shop and the placement of the equipment to insure prompt and efficient service.
- (b) D-5209.041 (3) (B).

D-5209.042. Ship's Service Men C—(Cobblers).

(1) SHIP'S SERVICE MAN C, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) PREPARATION OF SHOES.—Demonstrate ability to tear off worn soles and heels in preparation for repairing without damaging the shoes.
- (c) SHOE REPAIRS.—Demonstrate ability to make simple repairs to shoes.
- (d) FINISHING.—Demonstrate ability to dress down and finish off repaired shoes.
- (e) RECORDS.—Demonstrate ability to keep shoe repair records according to own ship's system.
- (f) MAINTENANCE.—Demonstrate ability to care for and sharpen tools used.

Demonstrate ability to lubricate, adjust, and make minor repairs to shoe repair equipment.

(B) EXAMINATION SUBJECTS.

- (a) COBBLER SHOP PRACTICES.—Know the regulations and practices for the efficient operation of the cobbler shop on own ship or station.
- (b) SHOE REPAIRS.—Know the operations required for the repair of shoes regardless of their condition.
- (c) SHAPE.—Know how to retain correct shoe shape when making repairs, including the correct way to fit a sole, and the proper way to stitch a shoe without drawing it.
- (d) SUPPLIES.—Knowledge of the correct materials and supplies used in repairing shoes.
- (e) PREPARATION.—Know the correct preparation of shoes before repairing, such as buffing shank before stitching, removing the worn sole and heel, and inspecting the welt to determine whether or not it will take resoling.
- (f) TOOLS.—Know the correct tools used in repairing shoes.
- (g) EQUIPMENT.—Know the correct operation of all commonly used shoe repair machinery, such as stitcher, patcher, stapler, trimmer, and finisher.
- (h) D-5203.

(2) SHIP'S SERVICE MAN C, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) SHOE REPAIRS.—Demonstrate proficiency in making all repairs to shoes, using shoe repairing machinery.
- (b) DYEING.—Demonstrate ability properly to treat shoes, boots, and leather goods for dyeing. Demonstrate ability to select proper types and kinds of dyes and to use them effectively.
- (c) MAINTENANCE OF TOOLS AND EQUIPMENT.—Demonstrate ability to maintain tools and equipment, including lubrication and sharpening of machines and components.
- (d) ADJUSTING AND REPLACING EQUIPMENT PARTS.—Demonstrate ability to make adjustments and simple replacement of parts to shoe repairing equipment.
- (e) EQUIPMENT REPAIRS.—Demonstrate ability to make minor repairs to all shoe repairing equipment.
- (f) CUTTING LEATHER.—Demonstrate ability to cut soles from leather strips economically.
- (g) SHOP MANAGEMENT.—Demonstrate ability to operate a small cobbler shop (1 or 2 cobblers), having responsibility for supplies and equipment, maintaining a clean and orderly shop, and providing efficient service.
- (h) D-5209.042 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) CONSTRUCTION.—Elementary knowledge of shoe construction.
- (b) SUPPLIES AND EQUIPMENT.—Know the types, characteristics, and uses of common cobbler shop supplies and equipment. Know the procedure in own shop for purchasing and accounting for supplies and equipment used.
- (c) LEATHER.—Know the kinds and grades of leather used for shoes, belts, sheaths, kits, and cases.
- (d) D-5209.042 (1) (B).

(3) SHIP'S SERVICE MAN C, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head cobbler in

a medium-sized cobbler shop (approximately 3 or 4 cobblers), having responsibility for organizing and supervising its clean and efficient operation.

- (b) SUPERVISION.—Demonstrate ability to instruct and supervise subordinate cobblers in performing cobbler services.
- (c) REPAIRS AND ALTERATIONS.—Demonstrate ability to make the more difficult alterations, such as rewelting shoes, rebuilding shoes, and performing simple orthopedic work.
- (d) MAINTENANCE.—Demonstrate ability to supervise the care, lubrication, adjustment, and minor repairs of tools and shoe repair equipment, including the installation of new parts.
- (e) SUPPLIES.—Demonstrate ability to estimate and order cobbler's supplies, and to check the quality of supplies received.
- (f) D-5209.042 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) COBBLER SHOP PRACTICES.—Know how to prepare for the approval of the commanding officer supplementary instructions for own ship or station, including schedules, and system of charges.
- (b) CONSTRUCTION.—Detailed knowledge of shoe construction.
- (c) LEATHER GOODS.—Know how to make repairs on miscellaneous leather goods commonly used in the Navy, such as leather belts, sheaths, kits, and cases.
- (d) SUPPLIES.—Thorough knowledge of all cobbler shop supplies and equipment needed for own shop.
- (e) INVENTORY.—Know the procedures used for taking inventory of cobbler shop supplies.
- (f) D-5209.044 (2) (B).

(4) CHIEF SHIP'S SERVICE MAN C.

(A) PRACTICAL FACTORS.

- (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head cobbler in a large cobbler shop (approximately 6 or more cobblers).
- (b) SUPERVISION.—Demonstrate ability to organize and direct the work and training of all subordinates.
- (c) ORTHOPEDIC WORK.—Demonstrate ability to do special orthopedic shoe rebuilding as required and supervise such work performed in own cobbler shop.
- (d) D-5209.042 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) SHOE REBUILDING.—Knowledge of shoe rebuilding required for special cases, such as orthopedic shoe work.
- (b) MANAGEMENT.—Know thoroughly cobbler shop layout, organization, and practices that insure quality work and efficient service.
- (c) EQUIPMENT.—Know how to install, regulate, and adjust all cobbler shop equipment.
- (d) D-5209.042 (3) (B).

D-5209.043. Ship's Service Men L—(Laundrymen).

(1) SHIP'S SERVICE MAN L, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) WASHING EQUIPMENT.—Demonstrate ability to operate under close

supervision washing equipment by following standard outlines of instructions. Demonstrate ability under general supervision to prepare and use standard stock solutions.

- (c) OTHER EQUIPMENT.—Demonstrate ability to operate other laundry equipment, such as extractors, tumblers, presses, and flat work ironers.
- (d) STAIN REMOVAL.—Demonstrate ability to recognize the most common stains and to remove them through the use of standard stain-removing agents.
- (e) SUPERVISION.—Demonstrate ability to instruct and oversee non-rated personnel detailed to laundry.
- (f) RECEIVING AND FINISHING.—Demonstrate ability to mark, list, and sort incoming articles; and to finish, fold, assemble, and pack finished articles.
- (g) MAINTENANCE.—Demonstrate ability to clean, lubricate, and make operating adjustments to laundry equipment. Demonstrate ability to care for ironer pads and covers.

(B) EXAMINATION SUBJECTS.

- (a) WASHING FORMULAS.—Know the standard formulas for the kinds of articles commonly washed in a naval laundry.
- (b) KINDS OF WORK.—Know the kinds of work done in a naval laundry, including bulk clothing from divisions, flat work from the wardroom and mess, and clothing from chief petty officers and commissioned officers; and know the procedures for handling such categories.
- (c) SAFETY PRECAUTIONS.—Know the safety precautions to be observed in the operation of all naval laundry equipment.
- (d) EQUIPMENT.—Know the names and uses of principal types of laundry equipment, and know the general construction of each, including the nomenclature and functions of main parts.
- (e) RECORDS AND REPORTS.—Know what records and reports are maintained in the operation of a naval laundry.
- (f) D-5203.

(2) SHIP'S SERVICE MAN L, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) WASHING.—Demonstrate ability on a watch to operate a washing machine without direct supervision, following established operating instructions and using formulas.
- (b) SUPERVISION.—Demonstrate ability to supervise a watch in the operation of drying and finishing equipment.
- (c) FINISHING PROCESSES.—Demonstrate knowledge of special finishing processes required by some types of articles.
- (d) EQUIPMENT REPAIRS.—Demonstrate ability to make minor repairs to all laundry equipment.
- (e) D-5209.043 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) WASHING FORMULAS.—Explain the conditions under which standard formulas are used in a naval laundry.
- (b) SUPPLIES AND MATERIALS.—Know the principal kinds of supplies and materials used in a naval laundry; know the uses and characteristics of each.
- (c) TESTS.—Know the tests of water and washing solutions commonly used in a laundry.
- (d) FIBERS AND TEXTILES.—Know the characteristics of common types of fibers and textiles, and know for each the proper methods of washing and finishing, including possible damage through the use of improper methods.

- (e) **DAMAGE.**—Know the common types of damage and know how to determine cause, and fix responsibility, for each type.
- (f) **CLAIMS.**—Know the procedures on own ship or station for the handling of loss and damage claims.
- (g) **CONSERVATION.**—Know the reasons for and methods of achieving conservation of power, water, steam, and laundry supplies.
- (h) D-5209.043 (1) (B).

(3) SHIP'S SERVICE MAN L, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) **ORGANIZATION, PLANNING, AND SUPERVISION.**—Demonstrate ability to organize the laundry on ships, such as destroyers and cruisers, or an equivalent laundry at a shore station; to plan the flow of work and the distribution and coordination of duties; and to supervise and train all subordinates in the operation of such a laundry.
- (b) **WASHING.**—Demonstrate ability to modify standard naval laundry formulas to meet specific conditions.
- (c) **DAMAGE.**—Demonstrate ability to recognize all types of damage and be able to determine cause, and fix responsibility, for each type.
- (d) **EQUIPMENT INSTALLATION.**—Demonstrate ability to install, regulate, and adjust all naval laundry equipment used in own ship or station.
- (e) D-5209.043 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) **PRODUCTION.**—Know thoroughly the sequence of laundry processes. Know the production capacities of each type of equipment and know how to use such data in planning flow of work.
- (b) **WASHING FORMULAS.**—Know how substitutions and modifications may be made in standard washing formulas. Be able to explain the reactions which take place in the use of each stock solution.
- (c) **DECONTAMINATION AND DISINFECTION.**—Know how laundry equipment may be used for decontamination and disinfection.
- (d) **SUPPLIES AND EQUIPMENT.**—Know thoroughly how to estimate supplies and equipment required and the procedures for purchasing, and accounting for, supplies and equipment.
- (e) **RECORDS AND REPORTS.**—Know how to maintain the records and to submit the reports required of a shipboard laundry.
- (f) D-5209.043 (2) (B).

(4) CHIEF SHIP'S SERVICE MAN L.

(A) PRACTICAL FACTORS.

- (a) **ORGANIZATION, PLANNING, AND SUPERVISION.**—Demonstrate ability to organize the laundry in ships such as battleships, aircraft carriers, and hospital ships, or an equivalent laundry at a shore station; to plan the flow of work and the distribution and coordination of duties; and to supervise and train all subordinates in the operation of such a laundry.
- (b) D-5209.043 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) **LAUNDRY LAYOUT.**—Knowledge of the layout of a laundry and the placement of the equipment to insure efficiency in the handling and flow of the work through the laundry.
- (b) D-5209.043 (3) (B).

D-5209.044. Ship's Service Men T—(Tailors).

(1) SHIP'S SERVICE MAN T, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) REPAIRS.—Demonstrate ability to make simple repairs to clothing.
- (c) SEWING.—Demonstrate ability to sew by hand using common stitches; and to use both treadle and electric sewing machines.
- (d) BADGES AND INSIGNIA.—Demonstrate ability to make up campaign ribbons from stock and to sew on uniforms such items as gold braid, line or staff insignia, rating badges, watch marks, and tape for collars and cuffs on jumpers.
- (e) PRESSING.—Demonstrate ability to sponge and press uniforms through use of a tailor's steam press. Demonstrate ability to give proper care to presser and to change pads as required.
- (f) SPOTTING.—Demonstrate ability to remove common stains, such as grease, food, and paint, using standard cleaning compounds.
- (g) RECEIPT AND DELIVERY OF CLOTHING.—Demonstrate ability to receive and mark clothing brought in for service, collecting chits and keeping records according to own ship's system.
- (h) MAINTENANCE.—Demonstrate ability to care for shears and knives; and to lubricate, adjust, and make minor repairs to sewing machines and pressers.

(B) EXAMINATION SUBJECTS.

- (a) TAILORING SHOP PRACTICES.—Know the regulations and practices for the operation of the tailoring shop in own ship or station.
- (b) UNIFORM REGULATIONS.—Have a general knowledge of uniform regulations. Know rules of own ship or station which prescribe the uniform of the day.
- (c) FABRICS.—Recognize common uniform fabrics and know the principal characteristics of each.
- (d) SUPPLIES.—Know the types, characteristics, and uses of common tailoring shop supplies.
- (e) D-5203.

(2) SHIP'S SERVICE MAN T, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) SEWING.—Demonstrate ability to lay out and do simple embroidery, such as working in stars on dress jumpers.
- (b) REPAIRS AND ALTERATIONS.—Demonstrate proficiency in making repairs to clothing and ability to make less difficult alterations, such as the shortening or lengthening of sleeves or trousers, replacing buttons with a zipper, replacing worn coat collars, and altering the waist or crotch of trousers.
- (c) DRY CLEANING.—Demonstrate ability to make arrangements with a commercial firm, when such facilities are available, to have dry cleaning done.
- (d) SHOP MANAGEMENT.—Demonstrate ability to operate a small tailoring shop (1 or 2 tailors), having responsibility for supplies and equipment, for maintaining a clean and orderly shop, and for providing efficient service.
- (e) D-5209.044 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) UNIFORM REGULATIONS.—Have a detailed knowledge of uniform regulations in so far as they set forth approved insignia and uniform styles. Know the alterations permitted in enlisted personnel uniforms.

- (b) CONSTRUCTION.—Have an elementary knowledge of the construction of garments in order to make the alterations required in (2) (A) (b) above.
 - (c) FABRICS.—Know the characteristics of fabrics and any special treatment they should receive in alterations, dry cleaning, mending, spotting, and pressing.
 - (d) SUPPLIES AND EQUIPMENT.—Know the procedures in own shop for purchasing and accounting for supplies and equipment.
 - (e) D-5209.044 (1) (B).
- (3) SHIP'S SERVICE MAN T, FIRST CLASS.
- (A) PRACTICAL FACTORS.
 - (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head tailor in a medium-sized tailoring shop (approximately 3 or 4 tailors), having responsibility for organizing and supervising its clean and efficient operation.
 - (b) SUPERVISION.—Demonstrate ability to train and supervise subordinate tailors in performing tailoring services.
 - (c) REPAIRS AND ALTERATIONS.—Demonstrate ability to make the more difficult alterations, such as altering the shoulders or backs of coats and the relining of coats.
 - (d) MAINTENANCE.—Demonstrate ability to supervise the care, lubrication, adjustment, and minor repair of tailoring shop equipment.
 - (e) D-5209.044 (2) (A).
 - (B) EXAMINATION SUBJECTS.
 - (a) TAILORING SHOP PRACTICES.—Know how to prepare for the approval of the commanding officer supplementary instructions for own ship or station, including schedules and system of charges.
 - (b) UNIFORM REGULATIONS.—Know thoroughly the uniform regulations of the Navy.
 - (c) CONSTRUCTION.—Have a thorough knowledge of the construction of garments.
 - (d) CLOTHING CARE.—Have a working knowledge of the proper methods for the general care of clothing in different climates.
 - (e) SUPPLIES.—Know how to estimate supplies and equipment required for own shop. Know thoroughly the procedures for purchasing and accounting for supplies and equipment.
 - (f) D-5209.044 (2) (B).
- (4) CHIEF SHIP'S SERVICE MAN T.
- (A) PRACTICAL FACTORS.
 - (a) SHOP MANAGEMENT.—Demonstrate ability to serve as head tailor in charge of a large tailoring shop (approximately 6 tailors), in a ship or station, having responsibility for organizing and supervising its clean and efficient operation.
 - (b) D-5209.044 (3) (A).
 - (B) EXAMINATION SUBJECTS.
 - (a) MANAGEMENT.—Know thoroughly tailoring shop layout, organization, and practices that insure quality work and efficient service.
 - (b) EQUIPMENT.—Know how to install, regulate, and adjust all tailoring shop equipment.
 - (c) D-5209.044 (3) (B).

D-5209.05. Hospital Apprentices.

(1) HOSPITAL APPRENTICE, SECOND CLASS.

A hospital apprentice, second class, must meet the qualifications of a seaman, second class (D-5205.01 (1)), and in addition must be judged qualified for Hospital Corps duty by a medical officer, must present evidence of having satisfactorily completed two (2) full years of high school or its equivalent, and must be a graduate of a Hospital Corps School or present evidence of equivalent training or professional education.

(2) HOSPITAL APPRENTICE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) **FIRST AID.**—Demonstrate ability to give first aid treatment for shock and hemorrhage.
- (b) **ARTIFICIAL RESPIRATION.**—Demonstrate standard method of artificial respiration.
- (c) **RECORDS AND CHARTS.**—Demonstrate clinical recording and charting.
- (d) **NURSING.**—Demonstrate ability to perform morning and evening care of bed patients.

(B) EXAMINATION SUBJECTS.

NOTE.—All examinations of hospital apprentices and pharmacist's mates will be given, marked, and reported in accordance with current instructions from the Bureau of Naval Personnel and the Bureau of Medicine and Surgery.

- (a) **ANATOMY AND PHYSIOLOGY.**—Elementary knowledge of anatomy and physiology.
- (b) **MINOR SURGERY AND FIRST AID.**—Elementary knowledge of minor surgery and first aid.
- (c) **NURSING.**—Elementary knowledge of nursing.
- (d) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Graduation from an approved Hospital Corps School or its equivalent.

D-5209.06. Pharmacist's Mates.

(1) PHARMACIST'S MATE, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) **FIRST AID AND MINOR SURGERY.**—Demonstrate application of various types of splints, dressings, and bandages.
- (c) **ADMINISTRATION OF MEDICINE.**—Demonstrate administration of medicine by mouth, by injection, by inhalation, by rectum, subcutaneously, and intramuscularly.
- (d) **SUPERVISION.**—Demonstrate ability to supervise cleaning and sterilization of mess gear.
- (e) D-5209.05 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) **ANATOMY AND PHYSIOLOGY.**—Detailed knowledge of anatomy and physiology.
- (b) **MINOR SURGERY AND FIRST AID.**—Working knowledge of minor surgery and first aid.
- (c) **NURSING.**—Working knowledge of nursing and elementary knowledge of ward management, and operating room and surgical technique.

- (d) MATERIA MEDICA.—Elementary knowledge of materia medica and therapeutics.
- (e) HYGIENE.—Elementary knowledge of hygiene and sanitation.
- (f) D-5209.05 (2) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5209.05 (2) (C).

(2) PHARMACIST'S MATE, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) SURGICAL TECHNIQUES.—Demonstrate ability to sterilize and set up complete tray for minor operation.
- (b) PHARMACY.—Demonstrate ability to prepare simple pharmaceutical compounds.
- (c) DIETS.—Demonstrate ability to prepare food for patients.
- (d) SUPERVISION.—Demonstrate ability to supervise ward.
- (e) CLERICAL DUTIES.—Demonstrate ability to prepare and type official letters.
- (f) D-5209.06 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ANATOMY AND PHYSIOLOGY.—Thorough and comprehensive knowledge of anatomy and physiology.
- (b) MINOR SURGERY AND FIRST AID.—Detailed knowledge of minor surgery and first aid.
- (c) NURSING.—Detailed knowledge of nursing, ward management, and operating room and surgical technique.
- (d) MATERIA MEDICA.—Detailed knowledge of materia medica and therapeutics.
- (e) HYGIENE.—Detailed knowledge of hygiene and sanitation.
- (f) DIETS.—General understanding of diets and messing for the sick.
- (g) PHARMACY.—General understanding of pharmacy.
- (h) CHEMISTRY.—Working knowledge of chemistry.
- (i) CLERICAL FORMS AND PROCEDURES.—General understanding of clerical forms and procedures used in the Hospital Corps.
- (j) D-5209.06 (1) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5209.05 (2) (C).

(3) PHARMACIST'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) INJECTIONS.—Demonstrate ability to give intravenous injections.
- (b) MINOR SURGERY.—Demonstrate ability to suture minor wounds.
- (c) LABORATORY PROCEDURES.—Demonstrate ability to perform elementary laboratory procedures.
- (d) CLERICAL DUTIES.—Demonstrate ability to collect data for and prepare routine clerical and report forms as required by the Bureau of Medicine and Surgery.
- (e) LECTURES.—Demonstrate ability to prepare and deliver lectures on venereal disease preventive measures and first aid.
- (f) WATCH STANDING.—Demonstrate ability to perform routine duties in sick bay independent of medical officer.
- (g) D-5209.06 (2) (A).

(B) EXAMINATION SUBJECTS.

NOTE.—The examinations for pharmacist's mates, first class, and chief pharmacist's mates must disclose sufficient knowledge of the subjects to certify the men as qualified for assignment to duty independent of a medical officer.

- (a) MINOR SURGERY AND FIRST AID.—Thorough and comprehensive knowledge of minor surgery and first aid.
- (b) NURSING.—Thorough and comprehensive knowledge of nursing and ward management.
- (c) MATERIA MEDICA.—Thorough and comprehensive knowledge of materia medica and therapeutics.
- (d) HYGIENE.—Thorough and comprehensive knowledge of hygiene and sanitation.
- (e) DIETS.—Thorough and comprehensive knowledge of diets and messing for the sick.
- (f) PHARMACY.—Thorough and comprehensive knowledge of pharmacy.
- (g) CLERICAL FORMS AND PROCEDURES.—Detailed knowledge of clerical forms and procedures used in the Hospital Corps.
- (h) ANAESTHESIA.—Detailed knowledge of anaesthesia.
- (i) TYPEWRITING.—Typewrite for five (5) minutes at an average rate of not less than twenty (20) words a minute, with not more than five (5) errors. See standard instructions for tests in typewriting for yeomen. Touch system not required.
- (j) D-5209.06 (2) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5209.05 (2) (C).

(4) CHIEF PHARMACIST'S MATE.

(A) PRACTICAL FACTORS.

- (a) MANUAL OF THE MEDICAL DEPARTMENT.—Demonstrate familiarity with *Manual of the Medical Department*.
- (b) FOOD INSPECTION.—Demonstrate ability in inspection of foods.
- (c) D-5209.06 (3) (A).

(B) EXAMINATION SUBJECTS.

NOTE.—The examining board for chief pharmacist's mate must consist of three officers of the Medical Department, except in cases where three officers of the Medical Department are not available, in which cases the board may be composed of three officers, one of whom must be a medical officer.

- (a) ANAESTHESIA.—Thorough and comprehensive knowledge of anaesthesia.
- (b) ADMINISTRATION.—General understanding of Hospital Corps administration, which shall include thorough knowledge of the *Manual of the Medical Department*, pertinent sections of *U. S. Navy Regulations*, current directives, and general clerical procedures; knowledge of hospital supplies and property accountability; and knowledge of commissary supervision.
- (c) D-5209.06 (3) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) D-5209.05 (2) (C).

(5) ADDITIONAL TECHNICAL EXAMINATIONS.

In addition to any of the regularly prescribed examinations, all personnel who have been designated by the Bureau of Medicine and Surgery as x-ray technician,

laboratory technician, cardiograph technician, embalmer, etc., will be given examination and marks in such specialty in accordance with current instructions from the Bureau of Medicine and Surgery.

D-5209.061. Pharmacist's Mates (DP)—(Dental Prosthetic Technicians).

NOTE.—Candidates for pharmacist's mates (DP) shall meet the qualifications outlined below in lieu of those set forth in D-5209.06 for pharmacist's mates.

(1) PHARMACIST'S MATE (DP), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) **LABORATORY MAINTENANCE.**—Demonstrate ability to care for equipment, instruments, and supplies used in a dental prosthetic laboratory.
- (c) **IMPRESSION HANDLING.**—Demonstrate ability to assemble plaster impressions and to handle agar and alginate hydrocolloidal impression and duplicating materials preparatory to pouring casts.
- (d) **CAST CONSTRUCTION.**—Demonstrate ability to pour, separate, and trim casts and duplicate models.
- (e) **BASE PLATES AND OCCLUSAL RIMS.**—Demonstrate ability to make base plates and occlusal rims.
- (f) **CAST HANDLING.**—Demonstrate ability to mount casts in articulators, to flask and boil out cases, and to remove them from ejector and non-ejector flasks.
- (g) **CASE PROCESSING.**—Demonstrate ability to process methyl methacrylate and vulcanite cases.
- (h) **FINISHING.**—Demonstrate ability to grind, smooth, and polish cases.
- (i) D-5209.05 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) **ORAL ANATOMY.**—Know dental and oral anatomy as related to laboratory procedures.
- (b) **MATERIALS.**—Have general knowledge of composition, care, and uses of materials employed in dental prosthetics.
- (c) **PARTS AND FITTINGS.**—Know names, mechanical characteristics, care, and uses of parts and fittings of prosthetic laboratory equipment.
- (d) **LABORATORY OPERATIONS.**—Have general knowledge of the functions of the plaster, processing, metal, ceramic and acrylic, and finishing departments of a laboratory.
- (e) **SAFETY PRECAUTIONS.**—Know the safety precautions to be exercised in a laboratory with respect to operating and securing appliances.
- (f) **HYGIENE AND FIRST AID.**—Have general knowledge of first aid and industrial hygiene.
- (g) **NOMENCLATURE.**—General knowledge of prosthetic nomenclature.
- (h) D-5209.05 (2) (B).
- (i) D-5203.

(2) PHARMACIST'S MATE (DP), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) **WROUGHT METALS.**—Demonstrate ability to fabricate wrought metal as used in the laboratory.
- (b) **PATTERNS.**—Demonstrate acceptable ability to construct, sprue, invest, and burn out patterns for metallic framework of appliances.

- (c) CASTING AND ASSOCIATED TECHNIQUES.—Demonstrate ability to cast, solder, and heat treat precious metal.
- (d) REPAIRS.—Demonstrate ability to make ordinary repairs to prostheses.
- (e) WAXING.—Demonstrate ability to wax and finish denture cases.
- (f) DENTAL ARTICULATION.—Demonstrate acceptable ability to select, grind, and set up teeth in uncomplicated cases.
- (g) D-5209.061 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) DENTURE CONSTRUCTION.—Know the sequence and nature of all steps in the construction of full and partial dentures.
- (b) PRACTICAL METALLURGY.—Know practical metallurgy applicable to laboratory procedures involving precious and nonprecious metals.
- (c) PHYSICAL PROPERTIES.—Know the physical properties of plaster, casting and soldering investments, oxidizing and reducing fluxes, porcelain, waxes, acrylic resins, and vulcanizable rubber.
- (d) TECHNOLOGICAL PRINCIPLES.—Know principles of pattern making, spruing, investing, casting, soldering, surveying, and designing.
- (e) PROPERTY.—Know local and general instructions regarding acquisition, receipt, custody, issue, disposition, and associated functions pertaining to laboratory supplies and equipment.
- (f) D-5209.061 (1) (B).

(3) PHARMACIST'S MATE (DP), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SURVEY.—Demonstrate ability to survey partial denture cases.
- (b) DESIGN.—Demonstrate ability to design partial denture cases to conform to clinical and survey requirements.
- (c) DENTAL ARTICULATION.—Demonstrate ability to set up teeth expertly in anatomical articulation in any kind of case.
- (d) BRIDGE TECHNIQUES.—Demonstrate ability to perform acceptably any laboratory procedure involved in fixed or removable bridge construction.
- (e) EQUIPMENT REPAIRS.—Demonstrate ability to service and make minor repairs to laboratory equipment.
- (f) EQUIPMENT INSTALLATION.—Demonstrate ability, under supervision, to install laboratory equipment.
- (g) TRAINING.—Demonstrate ability to instruct personnel in techniques in which a pharmacist's mate (DP), third class, must be qualified.
- (h) D-5209.061 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) FAILURE ANALYSIS.—Describe principal causes of imperfect productions resulting from faulty laboratory techniques.
- (b) SURVEY.—Know the principles upon which survey of cases relating to the employment of all attachments is based.
- (c) DESIGN.—Know the principles upon which the design of all attachments is based.
- (d) CROWN AND BRIDGE TECHNIQUES.—Know the sequence and nature of all steps commonly used in crown and bridge techniques.
- (e) CLERICAL PROCEDURE.—Know clerical reports, records, and procedures connected with laboratory administration.
- (f) TRAINING.—Know how to formulate a course of instruction covering any phase of laboratory activity.
- (g) D-5209.061 (2) (B).

(4) CHIEF PHARMACIST'S MATE (DP).

(A) PRACTICAL FACTORS.

- (a) TECHNIQUES AND PROCEDURE.—Demonstrate expert proficiency in any laboratory technique or procedure.
- (b) EQUIPMENT INSTALLATION.—Demonstrate ability to supervise installation of laboratory equipment.
- (c) SUPERVISION.—Demonstrate ability to supervise laboratory, coordinating efficiently the work of each department.
- (d) PRODUCTION.—Demonstrate ability to estimate time and material required for any job, and be able to make up and route job orders.
- (e) TRAINING.—Demonstrate ability to organize and supervise the training of dental prosthetic technicians.
- (f) D-5209.061 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) TECHNIQUES.—Know in detail all commonly used laboratory techniques.
- (b) TECHNOLOGICAL PRINCIPLES.—Know in detail principles upon which any laboratory technique is based.
- (c) ORGANIZATION.—Know in detail the organization of a prosthetic laboratory.
- (d) PRODUCTION.—Know how to plan production with special consideration as to time, materials, and job orders.
- (e) D-5209.061 (3) (B).

D-5209.07. Buglers.

NOTE.—All candidates for bugler, first class, buglemaster, third class, second class, and first class, shall be examined, if practicable, by a chief musician of a ship or station other than that on which the candidate is stationed. Candidates for chief buglemaster shall be examined if practicable, by a board of two (2) chief musicians from ships or stations other than that on which the candidate is stationed.

(1) BUGLER, SECOND CLASS.

A bugler, second class, must meet the qualifications of a seaman, second class (D-5205.01 (1)), and in addition must show aptitude for assignment as a bugler and be physically adapted to play the bugle.

(2) BUGLER, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) BUGLE CALLS.—Demonstrate ability to sound correctly from memory routine bugle calls used aboard ship as set forth in the *Manual for Buglers*, U. S. Navy.
- (b) WATCH STANDING.—Demonstrate ability to stand satisfactorily a routine bugle watch.
- (c) CARE OF BUGLE.—Demonstrate ability to use, care for, and handle a bugle properly. (Inspection should show bugle in good condition.)
- (d) D-5209.07 (1).

(B) EXAMINATION SUBJECTS.

Know the following subjects in elementary musical theory:

- (a) Qualities of musical sounds.
- (b) Signs denoting pitch.
- (c) Signs of duration.
- (d) Time signatures.
- (e) Words and signs used in musical composition.

- (f) Musical abbreviations.
- (g) Treble clef.

And the following additional subjects:

- (h) MANUAL FOR BUGLERS.—Thorough knowledge of the complete text of the *Manual for Buglers*, U. S. Navy.
- (i) TABLE OF HONORS.—Familiarity with that portion of the Table of Honors pertaining to buglers, as set forth in Chapter 5 of *U. S. Navy Regulations*.
- (j) D-5209.07 (1).

D-5209.071. Buglemasters.

NOTE.—See note under D-5209.07.

(1) BUGLEMASTER, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) CALLS.—Demonstrate ability to sound correctly from memory all bugle calls, flourishes, and "sound-off."
- (c) MARCHES.—Demonstrate ability to sound correctly from memory at least four (4) bugle marches as given in the *Manual for Drummers, Trumpeters, and Fifers*, U. S. Marine Corps.
- (d) EXERCISES.—Demonstrate ability to sound correctly all bugle exercises in the *Manual for Buglers*, U. S. Navy.
- (e) WATCH STANDING.—Demonstrate ability to stand satisfactorily a bugle watch on the quarterdeck for honors.
- (f) SUPERVISION.—Demonstrate ability to take charge of buglers on own ship or station. Demonstrate ability to make out properly and supervise bugle watches.
- (g) SIGHT READING.—Demonstrate ability to read bugle music at sight.
- (h) D-5209.07 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) CALLS.—Write in manuscript routine bugle calls used aboard ship as set forth in the *Manual for Buglers*, U. S. Navy.
- (b) REGULATIONS.—Know the Table of Honors, correct procedure for rendering same, and all references to music and buglers as set forth in Chapter 5 of the *U. S. Navy Regulations*.
- (c) FLAGS AND ENSIGNS.—Be able to identify the personal flags of flag officers of the U. S. Navy and the national and man-of-war ensigns of the principal maritime powers.
- (d) D-5207.09 (2) (B).
- (e) D-5203.

(2) BUGLEMASTER, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) RUDIMENTS.—Demonstrate ability to play from memory the first eight (8) rudiments and the ruffles on the snare drum.
- (b) SIGHT READING.—Demonstrate ability to play easy music for snare drum at sight.
- (c) CALLS, FLOURISHES, AND MARCHES.—Demonstrate ability to play correctly and proficiently from memory all bugle calls, flourishes, and marches as given in the *Manual for Drummers, Trumpeters, and Fifers*, U. S. Marine Corps.
- (d) MARCH BUGLING.—Demonstrate ability to play from memory the bugle parts to at least four (4) standard marches for band that contain bugling (trumpeting).

- (e) BATON TECHNIQUE.—Demonstrate ability to use properly the drum major's baton and to form and maneuver a band on the field.
- (f) CARE OF SNARE DRUM.—Demonstrate ability to use, care for, and handle a snare drum properly. (Inspection should show snare drum in good condition.)
- (g) D-5209.071 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) BATON TECHNIQUE.—Know the Manual of the Drum Major's Baton and other rules regarding the forming and maneuvering of a band on the field, as set forth in the *Manual for Drummers, Trumpeters, and Fifers*, U. S. Marine Corps.
- (b) CLOSE ORDER DRILL.—Familiarity with the regulations governing close order drill as set forth in Chapters 1, 2, and 3 of the *Landing Force Manual*.
- (c) CALLS AND MARCHES.—Write in manuscript all calls and marches played under (2) (A) (c) and (d) above.
- (d) RUDIMENTS.—Write from memory the first eight (8) rudiments for the snare drum.
- (e) D-5209.071 (1) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of a buglemaster's school approved by the Bureau of Naval Personnel.

(3) BUGLEMASTER, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) RUDIMENTS.—Demonstrate ability to play from memory the first thirteen (13) rudiments on the snare drum.
- (b) DRUM SOLO.—Demonstrate ability to play a rudimental drum solo.
- (c) BASS DRUMS AND CYMBALS.—Demonstrate ability to play the bass drum and cymbals correctly.
- (d) SIGHT READING.—Demonstrate ability to play drum music at sight.
- (e) DRUM MAJOR.—Demonstrate proficiency as a drum major.
- (f) SNARE DRUM.—Demonstrate ability to stretch and fit a head on a snare drum.
- (g) D-5209.071 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) DRUM AND BUGLE CORPS FORMATION.—Know the proper position of bugles, drums, and cymbals, when in drum and bugle corps formation.
- (b) CEREMONIES AND ESCORTS.—Thorough knowledge of the regulations governing ceremonies and escorts as set forth in the *Landing Force Manual*.
- (c) RUFFLES AND FLOURISHES.—Write from memory the four (4) ruffles and flourishes sounded for honors by a drum and bugle corps as set forth in the *Manual for Buglers*, U. S. Navy.
- (d) SOUND-OFF.—Write from memory the "sound-off" for a drum and bugle corps, used in parades, guard mounts, etc.
- (e) RUDIMENTS.—Write from memory the first thirteen (13) rudiments for the snare drum.
- (f) D-5209.071 (2) (B).

(4) CHIEF BUGLEMASTER.

(A) PRACTICAL FACTORS.

- (a) RUDIMENTS.—Demonstrate ability to play from memory all twenty-six (26) rudiments on the snare drum.

- (b) SUPERVISION.—Demonstrate ability to instruct and supervise buglers and drummers.
 - (c) MANEUVERS AND CEREMONIES.—Demonstrate ability to take charge of a drum and bugle corps and execute any maneuver or ceremony on board ship or on the field.
 - (d) PERFORMANCE.—Demonstrate proficiency as an accomplished bugler, drummer, and drum major.
 - (e) MARCH LEADING.—Demonstrate ability to lead a drum and bugle corps in conjunction with a band on the field playing marches containing bugling.
 - (f) ARRANGING.—Demonstrate ability to arrange for a drum and bugle corps by submitting to the examining board, as a part of the examination, an original march for bugles and drums.
 - (g) D-5209.071 (3) (A).
- (B) EXAMINATION SUBJECTS.
- (a) RUDIMENTS.—Write from memory all twenty-six (26) rudiments for the snare drum.
 - (b) REGULATIONS.—Thorough knowledge of all references pertaining to the band and buglers as set forth in *U. S. Navy Regulations*.
 - (c) BATON TECHNIQUE.—Thorough knowledge of the principles of baton technique as used in conducting.
 - (d) MANUAL FOR DRUMMERS.—Know the complete text of the *Manual for Drummers, Trumpeters, and Fifers*, U. S. Marine Corps.
 - (e) D-5209.071 (3) (B).

D-5209.08. Musicians.

NOTE.—All candidates for musician, third class, second class, and first class will be examined, if practicable, by a chief musician from a ship or station other than that upon which the candidate is stationed. Candidates for chief musician will be examined, if practicable, by a board consisting of two (2) chief musicians from ships or stations other than that on which the candidate is stationed.

(1) MUSICIAN, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) SCALES AND CHORDS.—Demonstrate ability to play fluently all major and minor scales and major and minor triads from memory. Drummers shall demonstrate ability to play the first eight (8) rudiments from memory.
- (c) TECHNICAL EXERCISES.—Demonstrate ability to play easy or moderately advanced technical exercises written for the instrument played.
- (d) INSTRUMENTAL MUSIC.—Demonstrate ability to perform satisfactorily at least third or fourth parts in instrumental music.
- (e) CARE OF INSTRUMENT.—Demonstrate proper use, handling and care of instrument played. (Inspection should show instrument in good condition.)
- (f) SIGHT READING.—Demonstrate ability to play easy music at sight.

(B) EXAMINATION SUBJECTS.

Know the following subjects in musical theory;

- (a) Major and minor key signatures.
- (b) Qualities of musical sounds; signs denoting pitch.
- (c) Signs of duration; time signatures.
- (d) Words and signs used in musical composition.
- (e) Musical abbreviations.
- (f) Names and keys of all commonly used instruments; names of voices.

And the following additional subjects:

- (g) TABLE OF HONORS.—Knowledge of that part of the Table of Honors pertaining to the band.
- (h) RUDIMENTS.—Drummers shall write from memory the first eight (8) rudiments.
- (i) D-5203.

(2) MUSICIAN, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) CHORDS, EMBELLISHMENTS, AND INTERVALS.—Demonstrate ability to play all dominant-seventh and diminished-seventh chords, augmented triads, embellishments, and intervals; drummers to play the first thirteen (13) rudiments from memory and to play major and minor scales and major and minor triads on bells.
- (b) TECHNICAL EXERCISES.—Demonstrate ability to play moderately advanced technical exercises written for the instrument played.
- (c) INSTRUMENTAL MUSIC.—Demonstrate ability to perform satisfactorily at least second parts in instrumental music.
- (d) TRANSPOSITION.—Demonstrate ability to transpose a tone higher or lower, at sight.
- (e) SIGHT READING.—Demonstrate ability to play moderately difficult music at sight.
- (f) D-5209.08 (1) (A).

(B) EXAMINATION SUBJECTS.

Know the following subjects in musical theory:

- (a) Treble and bass clefs.
- (b) Formation of diatonic and chromatic scales.
- (c) Intervals and related keys.
- (d) Chord formation; rules of part writing.
- (e) Root position and inversion of triads.
- (f) Simple harmonic and melodic progressions.
- (g) Phrases and cadences.
- (h) Harmonic minor.
- (i) Dominant-seventh chord and inversions.
- (j) Simple modulation.
- (k) Harmonization of simple melodies and basses.

And the following additional subjects:

- (l) RUDIMENTS.—Drummers shall write from memory the first thirteen (13) rudiments.
- (m) D-5209.08 (1) (B).

(3) MUSICIAN, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) TECHNICAL EXERCISES.—Demonstrate ability to play advanced technical exercises written for the instrument played; drummers to play all twenty-six (26) rudiments from memory and to play moderately advanced technical exercises for bells.
- (b) INSTRUMENTAL MUSIC.—Demonstrate ability to perform satisfactorily solo and first parts in instrumental music.
- (c) INSTRUMENTAL SOLO.—Demonstrate ability to play a solo, with accompaniment, written for the instrument played.
- (d) CONDUCTING.—Demonstrate ability to take charge of a concert band and conduct rehearsals, concerts and military formations.

- (e) FIELD MANEUVERS.—Demonstrate ability to use properly the drum major's baton and to form and maneuver a band on the field.
- (f) SIGHT READING.—Demonstrate ability to play difficult music at sight.
- (g) D-5209.08 (2) (A).

(B) EXAMINATION SUBJECTS.

Know the following subjects in musical theory:

- (a) Dominant-ninth chord and inversion.
- (b) Diminished-seventh chord.
- (c) Modulation.
- (d) Harmonization of figured basses and florid melodies containing modulations, using all chord material studied.
- (e) Alto and tenor clefs.
- (f) Ranges of all commonly used instruments; ranges of voices.

And the following additional subjects:

- (g) FORMING AND MANEUVERING.—Know the Manual of the Drum Major's Baton and other rules governing the forming and maneuvering of a band on the field as set forth in Chapters VII, IX, and X of the *Manual for Drummers, Trumpeters, and Fifers*, United States Marine Corps.
- (h) TABLE OF HONORS.—Know the Table of Honors; correct procedure for rendering same, and all references to music or the band as set forth in Chapter 5 of *U. S. Navy Regulations*.
- (i) CONDUCTING.—Know the principles of conducting technique.
- (j) RUDIMENTS.—Drummers shall write from memory all twenty-six (26) rudiments.
- (k) D-5209.08 (2) (B).

(4) CHIEF MUSICIAN.

(A) PRACTICAL FACTORS.

- (a) BAND ARRANGING.—Demonstrate ability to arrange for band by submitting to the examining board, as part of the examination, either an original composition, preferably a march, or other piece, arranged for military band. If not an original composition, the part from which the arrangement is made must be attached to the arrangement.
- (b) DANCE ORCHESTRA ARRANGING.—Demonstrate ability to arrange for dance orchestra by submitting a popular number arranged for a dance combination.
- (c) DANCE ORCHESTRA.—Demonstrate ability to take charge of a dance orchestra, rehearse, and play for a dance.
- (d) CONDUCTING.—Demonstrate thorough knowledge of conducting technique and principles of musical interpretation.
- (e) D-5209.08 (3) (A).

(B) EXAMINATION SUBJECTS.

Know the following subjects in musical theory:

- (a) Altered chords.
- (b) Sequences.
- (c) Non-essential notes; suspensions; pedal point.
- (d) Harmonization of figured basses and florid melodies containing modulations, using all chord material.

And the following additional subjects:

- (e) REGULATIONS.—Thorough knowledge of all references in *U. S. Navy Regulations* pertaining to music or to the band.

- (f) CEREMONIES AND ESCORTS.—Thorough knowledge of regulations governing ceremonies and escorts as set forth in the *Landing Force Manual*, U. S. Navy.
 - (g) INSTRUMENTS.—Know the principal parts and technicalities of all commonly used instruments.
 - (h) COMPOSERS.—Know the names, nationalities, and principal works of at least twenty (20) great composers, living or dead.
 - (i) INSTRUMENTAL ARTISTS.—Know the names, nationalities, and instruments of at least twenty (20) great instrumental artists, living or dead.
 - (j) PROGRAM PLANNING.—Know how to arrange a well-balanced program for both concert band and dance orchestra.
 - (k) ORIGINAL THEME.—Submit to the examining board, as part of the examination, an original theme on the life and accomplishments of any great conductor.
 - (l) D-5209.08 (3) (B).
- (C) SCHOOL QUALIFICATIONS.
- (a) Must be a graduate of the advanced course at the U. S. Navy School of Music, Navy Yard, Washington, D. C. (Before being eligible for transfer to the U. S. Navy School of Music for the advanced course, a candidate must have at least six (6) years total naval service, one (1) year of which must have been at sea as musician, first class.)

D-5210. COMMISSARY BRANCH.

D-5210.01. Ship's Cooks.

(1) SHIP'S COOK, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) GALLEY RANGE.—Demonstrate ability to start, operate, secure, and clean galley range in own ship or station.
- (c) WATCH STANDING.—Demonstrate ability to stand watch in the galley in own ship or station.
- (d) MECHANICAL APPARATUS.—Demonstrate ability to start, operate, stop, and clean all mechanical apparatus used in the preparation of food in own ship or station.
- (e) CUTS OF MEAT.—Demonstrate ability to cut meat properly for its various uses.
- (f) FOOD PREPARATION.—Demonstrate ability to prepare food for cooking and to supervise food preparation. Demonstrate ability to prepare, cook, and serve any four dishes selected by examining board, including a vegetable, meat, and dessert.

(B) EXAMINATION SUBJECTS.

- (a) SANITARY PRECAUTIONS.—Know the sanitary precautions to be observed by commissary personnel in the stowage, preparation, and issue of food.
- (b) CARE OF EQUIPMENT.—Know the routine to be observed for the maintenance and proper sanitary condition of refrigerators, vegetable lockers, meat blocks, etc.
- (c) ORGANIZATION.—Know the organization of the general mess in own ship or station.
- (d) REGULATIONS.—Know the regulations regarding the withdrawal of provisions from N. S. A. storerooms.

- (e) **FOOD THEORY.**—Know the classes and groups into which foods are divided and the function of each in a diet. Know the functions of vitamins and their source in various foodstuffs.
- (f) **MENUS.**—Prepare a menu for one week illustrating a properly balanced diet, and using the foodstuffs normally found on board ship. (Examining board will indicate the season and the location of the ship.)
- (g) **CUTS OF MEAT.**—Indicate on a quarter of beef and a side of veal the names, location, and proper uses of the various cuts of meat.
- (h) D-5203.

(2) **SHIP'S COOK, SECOND CLASS.**

(A) **PRACTICAL FACTORS.**

- (a) **CUTS OF MEAT.**—Demonstrate ability to cut meat properly and economically for its various uses.
- (b) **SUPERVISION.**—Demonstrate ability to supervise the delivery, inspection, and storage of provisions and fresh meats.
- (c) D-5210.01 (1) (A).

(B) **EXAMINATION SUBJECTS.**

- (a) **BILLS OF FARE.**—Be able to plan and prepare bills of fare.
- (b) **ORDERING AND COSTS.**—Given a sample bill of fare for a week's period, compute the quantity and cost of each item and the cost of the ration per man for that period. (Examining board will provide a copy of current contract prices.)
- (c) **REGULATIONS.**—Be familiar with the regulations and instructions with regard to the Navy ration, surveys, and sales to messes.
- (d) **KEEPING QUALITIES.**—Know the keeping qualities of the various kinds of provisions.
- (e) **STORAGE TEMPERATURES.**—Know the storage temperatures of the various kinds of provisions.
- (f) **RECIPES.**—Be familiar with standard Navy recipes.
- (g) D-5210.01 (1) (B).

(3) **SHIP'S COOK, FIRST CLASS.**

PRACTICAL FACTORS.

- (a) **SUPERVISION.**—Demonstrate ability as ship's cook in charge of the galley.
- (b) **FIELD KITCHEN.**—Demonstrate ability to set up and operate a field kitchen, field bake oven and camp ice box, if any or all of this equipment is available in own ship or station.
- (c) D-5210.01 (2) (A).

(B) **EXAMINATION SUBJECTS.**

- (a) **LANDING FORCE DUTIES.**—Know the duties of a ship's cook detail with a landing force. Know the variety and quantity of provisions and cooking utensils to be provided for a landing force under various conditions. Know how the field kitchen equipment for a landing force is arranged, including camp ice box, the kitchen pits, the kitchen fires, camp ovens, and incinerators.
- (b) **COMBAT DUTIES.**—Know the duties of commissary personnel in combat.
- (c) **FOOD THEORY.**—Have a full and complete knowledge of the constituents of meat and foodstuffs.
- (d) **REGULATIONS.**—Know in detail the current regulations and instructions governing general mess.
- (e) D-5210.01 (2) (B).

D-5210.011. Ship's Cooks B—(Butchers).

No qualifications published.

D-5210.02. Bakers.**(1) BAKER, THIRD CLASS.****(A) PRACTICAL FACTORS.**

- (a) D-5204 (1).
- (b) BAKERY EQUIPMENT.—Demonstrate ability to operate correctly the ovens, dough-mixing machinery, and other bakery equipment in own ship or station.
- (c) BAKING.—Demonstrate ability to bake bread, cake, pie, and simple pastries as required by examining board.

(B) EXAMINATION SUBJECTS.

- (a) SANITARY PRECAUTIONS.—Know the sanitary precautions to be observed by commissary personnel in the stowage, preparation, and issue of food.
- (b) ORGANIZATION.—Know the organization of the general mess in own ship or station.
- (c) REGULATIONS.—Know the regulations regarding the withdrawal of provisions from N.S.A. storerooms.
- (d) FOOD THEORY.—Know the classes and groups into which foods are divided and the function of each. Know the functions of vitamins and their source in various foodstuffs.
- (e) BREADS.—Know the kinds and uses of all breads served on board ship.
- (f) D-5203.

(2) BAKER, SECOND CLASS.**(A) PRACTICAL FACTORS.**

- (a) BAKING.—Demonstrate ability to bake bread, rolls, cakes, and pastries as required by examining board.
- (b) FIELD BREAD.—Demonstrate ability to set up a field oven and bake field bread, if own ship or station is equipped with field oven.
- (c) YEAST SUBSTITUTES.—Demonstrate ability to prepare substitutes for ready-made yeast.
- (d) D-5210.02 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) REGULATIONS.—Be familiar with the regulations and instructions with regard to the Navy ration, surveys, and sales to messes.
- (b) MECHANICAL APPLIANCES.—Know the construction and operation of all mechanical appliances found in bakeries aboard ship.
- (c) D-5210.02 (1) (B).

(3) BAKER, FIRST CLASS.**(A) PRACTICAL FACTORS.**

- (a) SUPERVISION.—Demonstrate ability as baker in charge of ship's bakery.
- (b) D-5210.02 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) LANDING FORCE DUTIES.—Know the duties of a cook detail with a landing force. Know the variety and quantity of provisions and cooking utensils to be provided for a landing force under various conditions. Know how the field kitchen equipment for a landing force is arranged, including camp ice box, the kitchen pits, the kitchen fires, camp ovens, and incinerators.

- (b) COMBAT DUTIES.—Know the duties of commissary personnel in combat.
- (c) D-5210.02 (2) (B).

D-5210.03. Chief Commissary Steward.

(1) CHIEF COMMISSARY STEWARD.

(A) PRACTICAL FACTORS.

- (a) FIELD KITCHEN.—Demonstrate ability to set up a field kitchen and a field bake oven if this equipment is carried on own ship or station.
- (b) CATERING.—Demonstrate ability to cater for enlisted men.
- (c) SUPERVISION.—Demonstrate ability to take complete charge of the delivery, handling, stowage, and issue of foodstuffs on ship or station to which attached. Demonstrate ability to direct the proper stowage of provisions and to estimate capacities of storerooms, including cold-storage spaces. Be able to direct the preparation and cooking of food in the galley and bake shop.
- (d) RECORDS AND REPORTS.—Demonstrate ability to keep accurate records and reports of all transactions connected with the general mess.
- (e) D-5210.01 (3) (A) OR D-5210.02 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) REGULATIONS.—Know the Navy regulations regarding subsistence allowance, commuted rations, and the regulations and current instructions pertaining to the general mess.
- (b) MENUS AND ORDERING.—Be able to plan menus and estimate the quantity of food required for a given number of men.
- (c) LANDING FORCE OPERATIONS.—Understand the operation of the Commissary Department in a landing force.
- (d) PRICES.—Know the current prices and the normal seasonal fluctuations in price of the various ingredients of the Navy ration and other foodstuffs that may be purchased for special occasions.
- (e) D-5210.01 (3) (B) OR D-5210.02 (3) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Must be a graduate of Cooks and Bakers School.

D-5211. STEWARDS' BRANCH.

D-5211.01. Steward's Mates.

(1) STEWARD'S MATE, SECOND CLASS.

A steward's mate, second class, must be conversant with general naval subjects required of all men in the Navy (D-5203), and in addition be able to keep rooms and compartments assigned to him in clean condition, know how to serve at table in an officers' mess, understand the operation of ship's laundry and orders in regard thereto, and be familiar with the various uniforms of commissioned officers.

(2) STEWARD'S MATE, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to direct other steward's mates as to serving at table in an officers' mess.
- (b) FOOD PREPARATION AND SERVICE.—Demonstrate ability to act as head pantry boy in officers' mess and assist the steward in preparation and service of food. Should be able to take charge in absence of steward.
- (c) ENGLISH.—Demonstrate ability to speak English with fair ability.
- (d) D-5211.01 (1).

(B) EXAMINATION SUBJECTS.

(a) CATERING.—Have a general knowledge of catering for officers' mess.

(b) D-5211.01 (1).

D-5211.02. Stewards.**(1) STEWARD, THIRD CLASS.****(A) PRACTICAL FACTORS.**

(a) D-5204 (1).

(b) SUPERVISION.—Demonstrate ability to take charge of steward's mates; to require good service, discipline, and cleanliness; and to direct steward's mates in the serving at the table in an officers' mess.

(c) CLEANING.—Demonstrate ability to perform satisfactorily duties in connection with the cleanliness of officers' rooms and clothing.

(d) TABLE SERVICE.—Demonstrate ability to perform satisfactorily duties in the officers' mess room.

(e) GALLEY RANGE.—Demonstrate ability to start, operate, and secure galley range in own ship or station.

(f) MECHANICAL APPARATUS.—Demonstrate ability to start, operate, and stop all mechanical apparatus used in the preparation of food in own ship or station.

(g) BAKING.—Demonstrate ability to bake bread, pie, and simple pastries.

(h) FOOD PREPARATION.—Demonstrate to the satisfaction of the examining board, ability to prepare, cook, and serve properly any four dishes selected by the examining board, including a vegetable, meat, and dessert.

(i) D-5211.01 (2) (A).

(B) EXAMINATION SUBJECTS.

(a) ARITHMETIC AND BOOKKEEPING.—Be proficient in arithmetic and bookkeeping to such a degree as to insure the accurate keeping of necessary records.

(b) SEATING ARRANGEMENTS.—Understand the proper seating arrangements for officers according to rank.

(c) MESS EQUIPMENT.—Understand the allowance of mess equipment, and the method of accounting for china, linen, and other equipment for the mess.

(d) MENUS.—Be able to make out balanced menus for different occasions, both at sea and in port.

(e) SANITARY PRECAUTIONS.—Know the sanitary precautions to be observed by commissary personnel in the preparation and issue of food.

(f) SAFETY PRECAUTIONS.—Know the safety precautions relative to the use of fuel oil and electricity in the galley.

(g) D-5211.01 (2) (B).

(h) D-5203.

(2) STEWARD, SECOND CLASS.**(A) PRACTICAL FACTORS.**

(a) SUPERVISION.—Demonstrate ability to assign, direct, and supervise the steward's mates in their various duties in the officers' mess room, and officers' rooms.

(b) RECORDS AND REPORTS.—Demonstrate ability to keep accurate records and reports of transactions connected with an officers' mess.

(c) CUTS OF MEAT.—Demonstrate ability to cut meat properly for its various uses.

- (d) FOOD STORAGE EQUIPMENT.—Demonstrate ability to maintain and keep in proper sanitary condition refrigerators and vegetable lockers.
- (e) D-5211.02 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) STORAGE.—Have knowledge of the proper storage of provisions.
- (b) ORDERING.—Be able to estimate quantities and kinds of foodstuffs in preparing for cruises.
- (c) PRICES.—Know the current prices and normal range of prices of staple and fancy foodstuffs.
- (d) REGULATIONS.—Know the regulations regarding the withdrawal of provisions from the storerooms.
- (e) ORGANIZATION.—Know the organization of the officers' messes in own ship or station.
- (f) CUTS OF MEAT.—Indicate on a quarter of beef and a side of veal the names, location, and proper uses of the various cuts of meat.
- (g) FOOD STORAGE EQUIPMENT.—Know the routine to be observed for the maintenance and proper sanitary conditions of refrigerators and vegetable lockers.
- (h) D-5211.02 (1) (B).

(3) STEWARD, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) DRILL.—Demonstrate ability to take charge of steward's mates at physical drill without arms.
- (b) SUPERVISION.—Demonstrate ability to supervise the delivery, inspection, and storage of provisions and fresh meats.
- (c) D-5211.02 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) REGULATIONS.—Be familiar with the regulations regarding commuted rations, subsistence allowance, and current instructions pertaining to an officers' mess.
- (b) MENUS.—Plan a menu for a given number of officers.
- (c) ORDERING.—Estimate quantity of different kinds of food necessary for the above planned menu.
- (d) FOOD THEORY.—Know the classes and groups into which food is divided and the functions of each.
- (e) LANDING FORCE DUTIES.—Know the duties of a steward detailed with a landing force.
- (f) D-5211.02 (2) (B).

(4) CHIEF STEWARD.

(A) PRACTICAL FACTORS.

- (a) PERFORMANCE.—Demonstrate ability as an outstanding steward and in addition be qualified to act as a cook.
- (b) EXPERIENCE.—Have served creditably as a leading steward of a ward-room mess, or of a flag officer's or commanding officer's mess for a period of at least three (3) years. (Proficiency in rating marks during these duty assignments must be at least 3.5 to be considered as having served creditably.)
- (c) LEADERSHIP ABILITY.—Demonstrate ability to instruct and supervise subordinates in their regular duties and in their duties at drills and general quarters.
- (d) SUPERVISION.—Demonstrate ability to direct the cooking, baking, and preparation of food.

- (e) RECORDS AND REPORTS.—Demonstrate ability to keep accurate records and reports of all transactions connected with an officers' mess.
- (f) FORMAL SERVICE.—Demonstrate ability to prepare tables for formal service.
- (g) D-5211.02 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) STORAGE.—Know the storage temperatures and the keeping qualities of the various kinds of food and provisions.
- (b) PRICES.—Know the current prices and the normal range of prices of staple and fancy foodstuffs in the various localities.
- (c) FIELD KITCHEN EQUIPMENT.—Know how the field kitchen equipment for a landing force is arranged, including the camp ice box, the kitchen pits, the kitchen fires, camp ovens, and incinerators.
- (d) COMBAT DUTIES.—Know the duties of stewards, cooks, and steward's mates in combat.
- (e) D-5211.02 (3) (B).

D-5211.03. Cooks.

(1) COOK, THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) GALLEY RANGE.—Demonstrate ability to start, operate, and secure galley range in own ship or station.
- (c) GALLEY MAINTENANCE.—Demonstrate ability to take charge of a small galley and maintain it in proper condition as regards cleanliness and upkeep.
- (d) MECHANICAL APPARATUS.—Demonstrate ability to start, operate, and stop all mechanical apparatus used in the preparation of food in own ship or station.
- (e) BAKING.—Demonstrate ability to bake bread, pie, and simple pastries.
- (f) FOOD PREPARATION.—Demonstrate to the satisfaction of the examining board, ability to prepare, cook, and serve properly any four dishes selected by the examining board, including a vegetable, meat, and dessert.
- (g) D-5211.01 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) SANITARY PRECAUTIONS.—Know the sanitary precautions to be observed by commissary personnel in the preparation and issue of food.
- (b) SAFETY PRECAUTIONS.—Know the safety precautions relative to the use of fuel oil and electricity in the galley.
- (c) EQUIPMENT ALLOWANCE.—Know the allowance of cooking utensils and galley equipment, and the method of accounting for these articles.
- (d) D-5211.01 (2) (B).
- (e) D-5203.

(2) COOK, SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) CUTS OF MEAT.—Demonstrate ability to cut meat properly for its various uses.
- (b) FOOD STORAGE EQUIPMENT.—Demonstrate ability to maintain and keep in proper sanitary condition refrigerators and vegetable lockers.
- (c) PERFORMANCE.—Demonstrate ability as a consistently good officers' cook.
- (d) D-5211.03 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) REGULATIONS.—Know the regulations regarding the withdrawal of provisions from the storerooms.
- (b) ORGANIZATION.—Know the organization of the officers' messes in own ship or station.
- (c) CUTS OF MEAT.—Indicate on a quarter of beef and a side of veal the names, location, and proper uses of the various cuts of meat.
- (d) D-5211.03 (1) (B).

(3) COOK, FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to supervise the delivery, inspection, and storage of provisions and fresh meats.
- (b) MENUS.—Demonstrate ability to prepare a menu for one week for a properly balanced diet using the foodstuffs normally found aboard ship.
- (c) ORDERING.—Demonstrate ability to estimate quantities and kinds of foodstuffs in preparing for cruises.
- (d) D-5211.03 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) MENUS.—Plan a menu for a given number of officers.
- (b) ORDERING.—Estimate quantity of different kinds of food necessary for the above planned menu.
- (c) FOOD THEORY.—Know the classes and groups into which foods are divided and the functions of each in a diet.
- (d) LANDING FORCE DUTIES.—Know the duties of an officers' cook detailed with a landing force.
- (e) D-5211.03 (2) (B).

(4) CHIEF COOK.

(A) PRACTICAL FACTORS.

- (a) FORMAL SERVICE.—Demonstrate ability to prepare tables for formal service.
- (b) RECORDS AND REPORTS.—Demonstrate ability to keep accurate records and reports of all transactions connected with an officers' mess.
- (c) SUPERVISION.—Demonstrate ability to direct the cooking, baking, and the preparation of food.
- (d) LEADERSHIP ABILITY.—Demonstrate ability to instruct and supervise subordinates in the stewards' branch in their regular duties, and in their duties at drills and general quarters.
- (e) PERFORMANCE.—Be an outstanding officers' cook and qualified to act as a steward.
- (f) D-5211.03 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) KEEPING QUALITIES.—Know the keeping qualities of the various kinds of provisions.
- (b) STORAGE TEMPERATURES.—Know the storage temperatures of the various kinds of provisions.
- (c) PRICES.—Know the current prices and the normal range of prices of staple and fancy foodstuffs in the various localities.
- (d) FIELD EQUIPMENT.—Know the field equipment for a landing force and the arrangement of the equipment.

- (e) PRECEDENCE.—Understand precedence relating to Army, Navy, Marine Corps, and Coast Guard.
- (f) D-5211.03 (3) (B).

D-5212. SPECIALISTS.

- (1) Specialist ratings are available during national emergencies for USNR (except Fleet Reserves) and USN (I) personnel *only*. Regular Navy personnel are not eligible. (See D-5101.)
- (2) The fact that a man holds a specialist rating does not imply that his qualifications and responsibilities are limited to those of his specialty. A petty officer must be first a leader, and second, a specialist. The twofold nature of duty in the Navy, military and technical (see D-5202, D-5203, and D-5204 (1)), applies to all branches.
- (3) Where applicable, designators have been adopted for the purpose of readily identifying enlisted personnel with special qualifications. (See current circular letters on this subject.)
- (4) When practicable, qualifications for specialist ratings will be published.
- (5) Specialist ratings, together with designators, are as follows:
 - (A) — Physical Training Instructors. (Not open to V-10 personnel.)
 - (C) — Classification Interviewers.
 - (F) — Fire Fighters. (Not open to V-10 personnel.)
 - (G) — Aviation Free Gunnery Instructors.
 - (I) — Punched Card Accounting Machine Operators.
 - (M) — Mail Clerks.
 - (O) — Inspectors of Naval Materiel. (Not open to V-10 personnel.)
 - (P) — Photographic Specialists:
 - (PG) — Photogrammetry.
 - (LB) — Laboratory.
 - (VM) — V-Mail.
 - (MP) — Motion Picture Production.
 - (Q) — Communication Specialists:
 - (CR) — Cryptographers.
 - (TE) — Technicians.
 - (IN) — Radio Intelligence.
 - (R) — Recruiters.
 - (S) — Shore Patrol. (Not open to V-10 personnel.)
 - (S) — Personnel Supervisors. (Open to V-10 personnel *only*.)
 - (T) — Teachers.
 - (LT) — Link Trainer Instructors.
 - (V) — Transport Airmen. (Not open to V-10 personnel.)
 - (W) — Chaplain's Assistants.
 - (X) — Specialists not elsewhere classified:
 - (ED) — Engineering Draftsmen.
 - (TD) — Topographical Draftsmen.
 - (CT) — Cartographers.
 - (PL) — Plastics Experts.
 - (TS) — Air Stations Operations Desk (Time Shack).
 - (QM) — Operations—Plotting and Chart Work.
 - (PI) — Pigeon Trainers.
 - (SB) — Telephone Switchboard Operator Supervisors.
 - (VA) — Visual Training Aids.
 - (Y) — Control Tower Operators.

D-5212.01. Specialists (A)—(Physical Training Instructors).

NOTE.—Specialists (A) must be at least twenty-one (21) years of age, with four (4) years of high school education or equivalent, and have had experience as a competitor or teacher in one or more highly competitive sports. (See current Recruit Rating Directives.)

(1) SPECIALIST (A), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) CALISTHENICS.—Demonstrate ability to conduct mass calisthenics.
- (c) SWIMMING AND LIFE SAVING.—Demonstrate ability to assist in teaching swimming and life saving.
- (d) SPORTS.—Demonstrate ability to assist in coaching a major or minor sport. Major sports as listed in the *Bluejackets' Manual* include the following: baseball, basketball, boxing, football, pulling races (U. S. Fleet), swimming, track, and wrestling. Sports considered as minor include: badminton, handball, soccer, softball, squash, tennis, touch football, tug-of-war, and volleyball.
- (e) PHYSICAL CONDITION.—Must be in first class physical condition. Must pass the Standard Navy Physical Fitness Test with a score of at least fifty (50).
- (f) LEADERSHIP.—Demonstrate leadership qualities required of a company commander by organizing and drilling large groups of men.
- (g) INSTRUCTING.—Demonstrate ability to give elementary instruction in small arms, ordnance, and seamanship.

(B) EXAMINATION SUBJECTS.

- (a) MAJOR SPORTS.—Have an elementary knowledge of the rules of the major sports.
- (b) NAVY PHYSICAL TRAINING PROGRAM.—Be familiar with the physical training program in the Navy, and its practical application.
- (c) NAVAL SUBJECTS.—Have a basic knowledge of naval administration, naval history, small arms, ordnance, and seamanship.
- (d) D-5203.

(2) SPECIALIST (A), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) DRILL.—Demonstrate ability to drill a group without arms.
- (b) MINOR SPORTS.—Demonstrate ability to take charge of and coach a group in at least one minor sport.
- (c) MAJOR SPORTS.—Demonstrate a teaching knowledge of at least three major sports.
- (d) SWIMMING AND LIFE SAVING.—Demonstrate a thorough knowledge of swimming and life saving methods.
- (e) LANDING FORCE MANUAL.—Demonstrate a thorough knowledge of Chapters 1 and 2 of the *Landing Force Manual*.
- (f) D-5212.01 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) FIRST AID.—Have a practical knowledge of first aid.
- (b) MAJOR SPORTS.—Have an elementary knowledge of the safety precautions pertaining to the major sports. Have a teaching knowledge of the important rules of the major sports.
- (c) D-5212.01 (1) (B).

(3) SPECIALIST (A), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) NAVY PHYSICAL TRAINING PROGRAM.—Demonstrate ability to plan and conduct a practical physical training and athletic program.
- (b) MAJOR SPORTS.—Demonstrate ability to take charge of and coach a major sport.
- (c) LANDING FORCE MANUAL.—Demonstrate a thorough knowledge of Chapters 3, 4, 10, and 11 of the *Landing Force Manual*.
- (d) DRILL.—Demonstrate ability to drill a group with or without arms.
- (e) D-5212.01 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) MAJOR SPORTS.—Be familiar with the evolution and history of at least one major sport.
- (b) SAFETY PRECAUTIONS.—Know the safety precautions to be observed pertaining to major sports.
- (c) ATHLETIC EVENTS.—Have a general knowledge of the Navy rules and regulations pertaining to athletic events and the awards made by the Navy for the most important events.
- (d) MINOR SPORTS.—Have a working knowledge of the rules governing the minor sports.
- (e) D-5212.01 (2) (B).

(4) CHIEF SPECIALIST (A).

(A) PRACTICAL FACTORS.

- (a) LEADERSHIP.—Demonstrate ability to plan, take charge of, and direct the physical training and athletic program on the ship or station to which assigned.
- (b) D-5212.01 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) NAVY PHYSICAL TRAINING PROGRAM.—Know the current instructions relative to the physical training program in the Navy.
- (b) MAJOR SPORTS.—Have a teaching knowledge of the rules and regulations governing all major sports.
- (c) RECORDS AND REPORTS.—Know how to keep the required records and reports.
- (d) D-5212.01 (3) (B).

D-5212.02. Specialists (C)—(Classification Interviewers).

(1) SPECIALIST (C), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) INTERVIEWING.—Demonstrate ability to meet enlisted personnel easily in individual conference, to establish rapport, and counsel objectively in regard to recommended assignment. Demonstrate ability to obtain required information from enlisted personnel with dispatch and accuracy.
- (c) ENLISTED PERSONNEL QUALIFICATIONS CARD.—Demonstrate ability to fill out the *Enlisted Personnel Qualifications Card* correctly, neatly, and legibly.
- (d) EMPLOYMENT EXPERIENCE.—Demonstrate ability to evaluate employment experience, determine civilian occupations, and recognize the relation of civilian jobs to naval ratings.

- (e) **DICTIONARY OF OCCUPATIONAL TITLES.**—Demonstrate ability to use the *Dictionary of Occupational Titles* to interpret occupational experience, assigning appropriate job titles and code numbers.
- (f) **TEST ADMINISTRATION.**—Demonstrate familiarity with general routines of test administration, and be able to act as proctor during testing session.
- (g) **TEST SCORING.**—Demonstrate ability to score tests manually in accordance with directions, maintaining a high degree of accuracy.
- (h) **RECOMMENDATIONS.**—Demonstrate ability to make recommendations for enlisted personnel in accordance with established principles, referring problem cases to a second interviewer when necessary.

(B) **EXAMINATION SUBJECTS.**

- (a) **BILLETS.**—Knowledge of billets for rated and nonrated men, the duties likely to be performed in these billets, and the provisions for earning ratings.
- (b) **MANUALS OF PROCEDURES.**—Knowledge of the instructions contained in the manuals for the selection OR classification office to which attached, such as *Manual of Procedures for Enlisted Personnel Selection and Classification Records*, *Manual of Procedures for U. S. Naval Training Station Selection Departments*, and *Manual of Billet Specifications for Enlisted Personnel*.
- (c) **SELECTION REQUIREMENTS.**—Knowledge of the selection requirements for naval ratings.
- (d) **SCHOOLS.**—Knowledge of the general types of training offered in service schools.
- (e) **PSYCHOLOGY.**—Elementary knowledge of psychology as applied to the problems of testing, interviewing, and classification.
- (f) **QUOTAS.**—Knowledge of the operation and significance of the quota system.
- (g) **TESTS.**—Familiarity with all tests used in the selection and classification processes and their significance in relation to assignments to service schools and billets.
- (h) **DIRECTIVES.**—Be thoroughly familiar with all current directives applying to classification OR selection.
- (i) **TEST SCORES.**—Knowledge of the significance of Navy Standard Scores.
- (j) D-5203.

(2) **SPECIALIST (C), SECOND CLASS.**

(A) **PRACTICAL FACTORS.**

- (a) **INTERVIEWING.**—Demonstrate ability to evaluate the qualifications of enlisted men, giving consideration to education, occupational background, and test scores. Demonstrate ability to complete the counseling process in difficult cases requiring the use of initiative and tact.
- (b) **LECTURES.**—Demonstrate ability to give informational lectures to groups of enlisted personnel concerning rates, schools, and billets.
- (c) **TESTS.**—Demonstrate ability to administer tests to groups of enlisted personnel.
- (d) **ORAL TRADE QUESTIONS.**—Demonstrate ability to administer *Oral Trade Questions*.
- (e) **SCORING METHODS AND AIDS.**—Demonstrate ability to use test scoring methods and aids used in own station.
- (f) **TABULATIONS.**—Demonstrate ability to make tabulations of test data.
- (g) D-5212.02 (1) (A).

(B) **EXAMINATION SUBJECTS.**

- (a) **ADVANCEMENT IN RATES.**—General knowledge of the requirements for advancement in rating.

- (b) NAVY TRAINING COURSES.—General familiarity with the characteristics of subject matter in the Navy Training Courses published for ratings for which the interviewer classifies or selects enlisted personnel.
 - (c) BATTLE STATIONS.—General knowledge of battle stations common to the main types and classes of ships.
 - (d) D-5212.02 (1) (B).
- (3) SPECIALIST (C), FIRST CLASS.
- (A) PRACTICAL FACTORS.
- (a) INSTRUCTION.—Demonstrate ability to instruct other personnel in the use of the *Enlisted Personnel Qualifications Card* and the manual of procedures used in a particular office.
 - (b) ASSISTANCE AND ADVICE.—Demonstrate ability to assist other personnel in the use of the *Dictionary of Occupational Titles* and to advise them in coding the more difficult cases.
 - (c) D-5212.02 (2) (A).
- (B) EXAMINATION SUBJECTS.
- (a) STATISTICAL PROCEDURES.—Elementary knowledge of statistical methods as used at activity to which assigned.
 - (b) PUBLICATIONS.—Knowledge of the general content and use of all naval publications relating to the work or activity to which assigned.
 - (c) ELECTRIC PUNCHED CARD EQUIPMENT.—General knowledge of the use and purposes of punched cards and equipment used in activity to which assigned.
 - (d) D-5212.02 (2) (B).
- (4) CHIEF SPECIALIST (C).
- (A) PRACTICAL FACTORS.
- (a) INSTRUCTION AND SUPERVISION.—Demonstrate ability to instruct and supervise subordinates in carrying out the procedures and techniques of all phases of the classification OR selection process.
 - (b) CLERICAL PROCEDURES.—Demonstrate ability to direct the clerical procedures in selection OR classification work.
 - (c) SCHEDULING.—Demonstrate ability to prepare schedules of interviews for groups of enlisted men.
 - (d) ENLISTED PERSONNEL QUALIFICATIONS CARD.—Demonstrate ability to review the *Enlisted Personnel Qualifications Cards* for completeness and judge suitability of recommendations.
 - (e) FINAL SELECTION.—Demonstrate ability to supervise the process of the final classification OR selection of enlisted personnel to fill shipboard billets or quotas.
 - (f) ELECTRIC PUNCHED CARD EQUIPMENT.—Demonstrate familiarity with the operation and use of electric punched card equipment used in activity to which assigned.
 - (g) TESTS.—Demonstrate ability to direct the administering of the psychological tests used in the selection OR classification process.
 - (h) D-5212.02 (3) (A).
- (B) EXAMINATION SUBJECTS.
- (a) OFFICE PROCEDURES.—Thorough knowledge of all selection OR classification office procedures and techniques including all reporting and record-keeping requirements of activity to which attached.

- (b) REFERENCE MATERIAL.—Thorough knowledge of all reference materials used in the selection OR classification office.
- (c) D-5212.02 (3) (B).

D-5212.03. Specialists (F)—(Fire Fighters).

(1) SPECIALIST (F), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) EXPERIENCE.—At least one (1) year of experience in a municipal fire department or five (5) years of experience as a volunteer fireman.
- (c) FIREMAN'S LIFT.—Demonstrate ability to use the fireman's lift.
- (d) ARTIFICIAL RESPIRATION.—Demonstrate proficiency in administering artificial respiration.
- (e) EVOLUTIONS.—Demonstrate ability to perform the required evolutions of hose lines and arrangements as given in the *Fire Fighting Manual*, published by the Bureau of Ships.
- (f) EXTINGUISHERS.—Demonstrate ability to operate, service, and recharge all types of fire extinguishers, including soda acid, foam, carbon-tetrachloride, and hand pumps.

(B) EXAMINATION SUBJECTS.

- (a) CHEMISTRY OF FIRE.—Knowledge of the elementary chemistry of fire.
- (b) PRINCIPLES OF EXTINGUISHMENT.—Knowledge of the basic principles of extinguishing fire by cooling and smothering.
- (c) HOSE AND FITTINGS.—Knowledge of the types and sizes of hose, fittings, couplings, and Navy threads.
- (d) NOZZLES.—Knowledge of the types of nozzles and their primary purposes.
- (e) FORCIBLE ENTRY TOOLS.—Knowledge of forcible entry tools and their use, including ax, door opener, claw tool, crowbar, and pike pole.
- (f) LADDERS.—Knowledge of the construction and use of ladders and methods of raising, lowering, and carrying them.
- (g) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Complete a thirty-day course of training at one of the Navy's Full Scale Fire Fighters' Schools.

(2) SPECIALIST (F), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) FORCIBLE ENTRY TOOLS.—Demonstrate ability to use forcible entry tools.
- (b) FIRE HAZARDS.—Demonstrate ability to recognize common and special fire hazards.
- (c) KNOTS.—Demonstrate ability to wind rope coil and tie all knots used in fire fighting, including square knot, becket bend, chimney hitch, bowline, half hitch, and clove hitch.
- (d) LADDERS.—Demonstrate ability to identify various types of ladders and familiarity with methods of raising and carrying them.
- (e) HOSE.—Demonstrate ability to roll and handle all kinds of hose and to care for, use, and stow it properly.
- (f) NOZZLES.—Demonstrate ability to use various types of nozzles in the extinguishment of fire and the ability to service and repair such nozzles.
- (g) D-5212.03 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) WATER.—Knowledge of the action of water in the form of solid stream or fog spray.
- (b) FOAM.—Knowledge of the difference between mechanical and chemical foam; how each type is generated; and the operation of the equipment used.
- (c) STEAM.—Knowledge of the use of steam in extinguishment and the precautions to be taken.
- (d) WATER SUPPLY.—Knowledge of the various sources from which water for fire fighting may be obtained.
- (e) FIRST AID.—Knowledge of first aid pertaining to injuries encountered in fires.
- (f) CARE AND SERVICING.—Knowledge of the care and servicing of all fire fighting equipment.
- (g) PUMPS.—Knowledge of the general principle of pumps and how they operate, including the piston, rotary gear, and centrifugal types.
- (h) MASKS.—Knowledge of the various types of rescue breathing apparatus, inhalators, respirators, and gas masks and their uses.
- (i) INCENDIARY BOMBS.—Knowledge of the construction and operating characteristics of incendiary bombs.
- (j) LAYING HOSE LINES.—Knowledge of the methods of laying hose lines from a hydrant, pump, or fire plug to the fire or from the fire to the water supply; up ladders; over roofs; into passage ways on board ship; and rigging jumps around breaks in fire mains.
- (k) D-5212.03 (1) (B).

(3) SPECIALIST (F), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) PUMPING EQUIPMENT.—Demonstrate ability to operate all portable or movable pumping equipment.
- (b) FIRST AID.—Demonstrate ability to administer advanced first aid with special emphasis on the use of respiratory equipment.
- (c) MASKS.—Demonstrate ability to use naval breathing equipment and masks.
- (d) SALVAGE.—Demonstrate a knowledge of approved salvage methods on shore.
- (e) INSPECTION.—Demonstrate ability to conduct a fire prevention inspection on both ship and shore establishment.
- (f) WELDING AND CUTTING EQUIPMENT.—Demonstrate ability to use portable oxyacetylene welding and cutting equipment.
- (g) FIRE INVESTIGATION.—Demonstrate ability to conduct an investigation to determine causes of fire and be able to distinguish indications of arson.
- (h) SUPERVISION.—Demonstrate ability to supervise a fire fighting party.
- (i) HYDRAULICS.—Demonstrate a working knowledge of fire fighting hydraulics.
- (j) FIRE FIGHTING.—Demonstrate a working knowledge of good fire fighting procedure ashore and afloat, including the use of proper fire fighting equipment.
- (k) D-5212.03 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) SPRINKLERS.—Knowledge of the various installed sprinkler systems in both buildings and ships, including automatic wet, automatic dry, and non-automatic sprinklers, fog systems, and water curtains.
- (b) SHIP EQUIPMENT.—Knowledge of the fire fighting equipment aboard

ships and how each is operated, including fixed fog spray, portable and fixed foam, and carbon-dioxide system.

- (c) MAINS.—Knowledge of water mains ashore and fire mains on board ship and how they are laid out and sectionalized.
- (d) HYDRAULICS.—Elementary knowledge of fire fighting hydraulics, friction loss, nozzle pressures, and discharge.
- (e) SERVICING PUMPS.—Knowledge of servicing all types of portable pumps used for fire fighting.
- (f) FREE WATER.—Knowledge of the effect of free water aboard ship.
- (g) SHIP STABILITY.—Elementary knowledge of the stability of ships and the effect of fire fighting operations.
- (h) OVERHAULING.—Knowledge of the theory and practice of finishing up after a fire.
- (i) SIZE UP.—Knowledge of the points to be observed in sizing up a fire and plotting its extinguishment.
- (j) HAZARDS.—Knowledge of the hazards attendant on various articles used in the naval establishment.
- (k) ISOLATION.—Knowledge of the methods of isolating a shipboard fire.
- (l) IMPROVISED SYSTEMS.—Knowledge of the principles, construction, and use of improvised fog systems.
- (m) WATER.—Knowledge of the use of heavy caliber streams of water, deluge sets, and how to protect buildings by water curtains under conflagration conditions.
- (n) ALARM SYSTEMS.—Knowledge of fire alarm systems and communications.
- (o) D-5212.03 (2) (B).

(4) CHIEF SPECIALIST (F).

(A) PRACTICAL FACTORS.

- (a) SUPERVISION.—Demonstrate ability to supervise and take full charge of operations at a fire.
- (b) TRAINING.—Demonstrate ability to train personnel in fire fighting techniques.
- (c) DRILLS.—Demonstrate ability to organize and direct fire drill.
- (d) LECTURE.—Demonstrate ability to lecture on all phases of fire fighting.
- (e) ORGANIZATION.—Demonstrate ability to organize and equip a fire brigade.
- (f) PLANT PROTECTION.—Demonstrate familiarity with the principles of plant protection, including the location of hose houses, auxiliary appliances, and correct location marking and maintenance.
- (g) D-5212.03 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) D-5212.03 (3) (B).

D-5212.04. Specialists (G)—(Aviation Free Gunnery Instructors).

(1) SPECIALIST (G), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) INSTRUCTION.—Demonstrate ability to give elementary instruction in aviation free gunnery on any firing range (excluding turret machine gun), on synthetic gunnery training devices, and in a classroom as an instructor's assistant.
- (c) RANGE FIRING.—Demonstrate ability to fire properly a shot gun, a ser-

vice pistol, machine gun, and turret machine gun. Know the causes of the most common kinds of stoppages and malfunctions and be able to correct them. Demonstrate ability to set up range for firing and to secure range and equipment when firing has ceased. Demonstrate a general knowledge of range procedure and safety precautions.

- (d) CARE OF ARMS.—Demonstrate ability to name and describe the functions of the principal parts of the arms listed in (1) (A) (c) above, to disassemble and assemble them, and to clean and lubricate the bore and working parts. Be able to adjust headspacing in machine guns, and to boresight machine guns using the template method.
- (e) AMMUNITION.—Demonstrate ability to identify common types of machine gun and small arms ammunition by the markings on containers or projectile tips. Demonstrate ability to examine machine gun ammunition and to belt it properly.
- (f) SYNTHETIC DEVICES.—Demonstrate ability to start, operate, and secure synthetic gunnery training devices and to perform simple cleaning, lubrication, repair, and adjustment of such equipment.

(B) EXAMINATION SUBJECTS.

- (a) ORDNANCE REGULATIONS.—General knowledge of ordnance regulations for the safe stowage and handling of arms and explosives.
- (b) RECOGNITION.—Recognition of the principal types of allied and enemy ships and aircraft from photographs, silhouettes, or models.
- (c) SIGHTING.—General knowledge of the principle of lead in gunnery and of the use of a ring sight in applying the most common sighting methods.
- (d) RANGE ESTIMATION.—Working knowledge of the use of aircraft machine gun sights in range estimation.
- (e) SYNTHETIC DEVICES.—Elementary knowledge of the principles of construction and operation of synthetic gunnery training devices, including the 3A-2, Gunairstructor, and related devices.
- (f) TERMINOLOGY.—Familiarity with the standard nomenclature and terms used in aviation gunnery and in the operation of synthetic training devices.
- (g) INSTRUCTION.—Knowledge of the principles of on-the-job training as applied to aviation gunnery instruction.
- (h) D-5203.

(C) SCHOOL QUALIFICATIONS.

- (a) Satisfactory completion of the course of instruction in a Naval Air Gunner's School or an Aviation Free Gunnery Unit, or equivalent instruction which shall include gunnery theory, range firing, 3A-2 operation, and Gunairstructor operation.

(2) SPECIALIST (G), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) INSTRUCTION.—Demonstrate ability to give detailed instruction in aviation free gunnery on any firing range (excluding turret machine gun), on synthetic gunnery training devices, and in classroom demonstrations or routine lectures. Demonstrate ability to diagnose the faults of students and to direct remedial practice.
- (b) RANGE FIRING.—Demonstrate facility in the proper firing of a shot gun, a service pistol, machine gun, and turret machine gun. Demonstrate a thorough knowledge of the kinds and causes of stoppages and malfunctions, and demonstrate skill in correcting them. Demonstrate ability to place the range crew and to organize a small group of students for firing. Demonstrate a thorough knowledge of range procedures and safety precautions.

- (c) CARE OF ARMS.—Demonstrate facility in the disassembly, assembly, cleaning, and lubrication of the arms listed in (2) (A) (b) above. Demonstrate facility in adjusting the headspacing of machine guns and in boresighting machine guns by the template method.
- (d) SYNTHETIC DEVICES.—Demonstrate proficiency in the operation of synthetic gunnery training devices and of attachments commonly used with them. Demonstrate ability to make all routine mechanical adjustments and repairs and to make simple electrical adjustments and repairs.
- (e) D-5212.04 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) ARMORY RECORDS.—General knowledge of records and reports required for issuing ammunition and for maintaining the firing history of individual guns.
- (b) SIGHTS AND SIGHTING.—General knowledge of aircraft machine gun sights and their construction, including ring, optical, and reflector sights, and of the uses of each type.
- (c) AMMUNITION.—General knowledge of the kinds, characteristics, and uses of aircraft machine gun ammunition and of the use of grade symbols and lot numbers.
- (d) SYNTHETIC DEVICES.—Detailed knowledge of the principles of construction and operation of synthetic gunnery training devices, including a knowledge of "trouble-shooting" methods to determine repairs and adjustments needed.
- (e) INSTRUCTION.—Knowledge of classroom teaching methods as applied to instruction in aviation gunnery, including the use of visual aids.
- (f) D-5212.04 (1) (B).

(3) SPECIALIST (G), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) INSTRUCTION.—Demonstrate ability to give comprehensive instruction in the theory and practice of aviation gunnery on any firing range, including turret machine gun, and on synthetic gunnery training devices, and to teach any of the less difficult classroom courses.
- (b) RANGE FIRING AND OPERATION.—Demonstrate facility in firing from hydraulic and electric turrets. Demonstrate ability to supervise the routine operation of a section of a range which may have more than one group of students on the firing line at one time.
- (c) SYNTHETIC DEVICES OPERATION.—Demonstrate ability to supervise the routine operation of a group of synthetic gunnery training devices.
- (d) MAINTENANCE.—Demonstrate ability to make, on such equipment as turrets and synthetic gunnery training devices, all repairs and adjustments not requiring the attention of special devices servicemen.
- (e) SUPERVISION.—Demonstrate ability to supervise the work and training of other specialists (G).
- (f) D-5212.04 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) ORDINANCE REGULATIONS.—Detailed knowledge of the regulations and instructions for the safe handling and stowage of arms and explosives. Detailed knowledge of the records and reports required for issuing ammunition and for maintaining the firing history of individual guns.
- (b) SIGHTS AND SIGHTING.—Detailed knowledge of aircraft machine gun sights and their construction and uses. Knowledge of the principal methods of sighting and the theory of each.

- (c) RANGE ESTIMATION.—Knowledge of the theory of range estimation using aircraft machine gun sights.
- (d) RECOGNITION.—General knowledge of the armament, armor, and performance characteristics of principal types of allied and enemy ships and aircraft.
- (e) BALLISTICS.—General knowledge of exterior ballistics, including the theory of boresighting.
- (f) SYNTHETIC DEVICES.—Thorough knowledge of the principles of construction and operation of synthetic devices and an understanding of the performance capabilities and limitations of such devices in aviation gunnery training.
- (g) INSTRUCTION.—Thorough knowledge of teaching methods applied by aviation gunnery instructors on the range, on synthetic devices, and in the classroom.
- (h) D-5212.04 (2) (B).

(C) SCHOOL QUALIFICATIONS.

- (a) Satisfactory completion of the aviation gunnery instructor's course at a Navy school established therefor.

(4) CHIEF SPECIALIST (G).

(A) PRACTICAL FACTORS.

- (a) INSTRUCTION.—Demonstrate ability to supervise instruction in aviation free gunnery given on any firing range and in a synthetic devices unit, and to instruct in any classroom course.
- (b) RANGE OPERATION.—Demonstrate ability, as an assistant to the officer in charge of a range, to supervise the work and training of the range crew and to be responsible for the proper care, maintenance, and handling of all guns and equipment.
- (c) SYNTHETIC DEVICES OPERATION.—Demonstrate ability to plan, schedule, and direct the activities of a synthetic devices unit and to be responsible for the proper care, simple maintenance, and operation of all equipment.
- (d) D-5212.04 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) AVIATION GUNNERY.—Thorough knowledge of the current practices and theories of aviation gunnery.
- (b) ORDNANCE REGULATIONS.—Thorough knowledge of the regulations and instructions for the safe handling and stowage of arms and explosives. General knowledge of ordnance allowances, requisitions, surveys, etc., involved in the maintenance of an armory.
- (c) EXPLOSIVES.—General knowledge of the principal types and characteristics of explosives and ordnance devices, including low and high explosives, fuzes, bombs, torpedoes, depth charge, mines, and aircraft pyrotechnics and smoke mixtures.
- (d) CORRESPONDENCE, RECORDS, AND REPORTS.—General knowledge of naval correspondence, filing system, and procedure for the requisitioning and maintenance of supplies. Thorough knowledge of all reporting and record-keeping requirements of the ship or station to which attached.
- (e) D-5212.04 (3) (B).

D-5212.05. Specialists (I)—(Punched Card Accounting Machine Operators).

NOTE.—Examining boards for specialist (I) ratings shall include at least one officer experienced in tabulating-machine systems. If no experienced officer is available,

recommendations in cases of eligible candidates shall be submitted to the Bureau of Naval Personnel. Such recommendations shall include a detailed summary of the candidate's experience in the specialty. In installations where equipment is used which does not utilize electrical plugboard set-ups, candidates shall be required to demonstrate ability to operate the equipment to which assigned.

(1) SPECIALIST (I), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) MACHINE OPERATION.—Demonstrate ability to operate control buttons and keys and to feed cards and report forms for sorting and tabulating machines, and in addition for at least two of the following machines: interpreter, reproducer, collator, multiplier.
- (c) OPERATION SET-UPS.—Demonstrate ability to set up quickly and accurately the machines required in (1) (A) (b) above, following diagrams which indicate the correct use of all operating controls.
- (d) WIRING.—Demonstrate ability to wire plugboards or prepare wiring diagrams for the machines required in (1) (A) (b) above, from verbal instructions, for such simple operations as straight listing, interpretation, reproducing, gang punching, merging, matching, etc.
- (e) SORTING.—Demonstrate ability to perform without detailed instructions ordinary operations involving block and alphabetic sorting, and to follow outlined procedures for any sorting operation.
- (f) EXPERIENCE.—Must have had six (6) months' experience as an operator of tabulator, collator, reproducer, or sorter.

(B) EXAMINATION SUBJECTS.

- (a) OPERATION.—Gang punch, sort, and prepare a listing for the examining board, employing a minimum of 100 currently used cards. (These operations shall include plugboard set-up without the aid of a diagram.)
- (b) MACHINE KNOWLEDGE.—General knowledge of the functions and uses of basic types of tabulating equipment.
- (c) FLOW OF WORK.—General knowledge of the flow of work through the machine tabulation process, with particular emphasis on the relationships between successive machine operations.
- (d) CARDS, FORMS, AND REPORTS.—Familiarity with the cards, forms, and reports used or prepared recurrently by the machines to which assigned.
- (e) D-5203.

(2) SPECIALIST (I), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) MACHINE OPERATION.—Demonstrate ability to operate control buttons and keys and to feed cards and report forms for all types of tabulating equipment. Be able to remove all card jams which do not require disassembly of the machine by a service man.
- (b) WIRING AND OPERATION SET-UPS.—Upon indication of desired end results and without further instructions, demonstrate ability to wire plugboards, or prepare wiring diagrams, and to set up machines for one-time, special operations which are not complex and for all recurring machine operations.
- (c) CONTROLS.—Demonstrate ability to balance and check work against the established controls. Be able to recognize and to correct obvious errors due to faulty machine operation.
- (d) SUPERVISION.—Demonstrate ability to act as group leader for a small

machine group, giving instructions in routine machine operation and overseeing the proper flow of work.

- (e) D-5212.05 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MACHINE KNOWLEDGE.—Detailed knowledge of the functions, uses, and capacity of basic types of tabulating equipment.
- (b) FLOW OF WORK.—Detailed knowledge of the flow of work through the machine tabulation processes and familiarity with the related manual operations.
- (c) CARDS, FORMS, AND REPORTS.—General knowledge of the cards, forms, and reports used or prepared recurrently by the machines to which assigned.
- (d) D-5212.05 (1) (B).

(3) SPECIALIST (I), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) SUPERVISION AND PLANNING.—Demonstrate ability to supervise machine operations (not including related manual operations) in a tabulating installation, including the ability to plan and execute work schedules.
- (b) CONTROLS.—Demonstrate ability to set up and maintain adequate controls on all machine operations. Be able to detect and to correct all errors caused by faulty machine operation.
- (c) TRAINING.—Demonstrate ability to train subordinates in all machine operations and to evaluate their work.
- (d) WIRING AND MACHINE OPERATION.—Demonstrate ability to wire plugboards and set up machines for all unusual and complex operations and to prepare wiring diagrams and other instructions for subordinates.
- (e) D-5212.05 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) OPERATION.—Prepare for the examining board a finished report involving complex and unusual set-ups in the use of all types of equipment at own station. (These operations shall include the wiring of *blank* plugboards and all machine adjustments required for the completion of the report.)
- (b) MACHINE KNOWLEDGE.—Thorough knowledge of the functions, uses, and capacity of all types of tabulating equipment, including those types equipped with special devices or attachments.
- (c) FLOW OF WORK.—Thorough knowledge of the flow of work through the machine tabulation processes and a general knowledge of the manual operations, including the relationships between machine and manual operations. Familiarity with the operations and records of other offices which most frequently supply source data to or are served by the tabulating installation.
- (d) CARDS, FORMS, AND REPORTS.—Thorough knowledge of the cards, forms, and reports used or prepared recurrently or as special projects by the machine group to which assigned.
- (e) D-5212.05 (2) (B).

(4) CHIEF SPECIALIST (I).

(A) PRACTICAL FACTORS.

- (a) SUPERVISION AND PLANNING.—Demonstrate ability to supervise both manual and machine operations in a tabulating installation, including the ability to plan, schedule, and execute the flow of work.
- (b) CONTROLS.—Demonstrate ability to set up and maintain adequate controls on all documents and manual operations related to machine operations.
- (c) FORMS AND PROCEDURES.—Demonstrate ability to design and lay out cards and report forms, and to prepare procedural handbooks.

- (d) TRAINING.—Demonstrate ability to train subordinates in all operations, both machine and manual, and to evaluate their work.
- (e) D-5212.05 (3) (A).

(B) EXAMINATION SUBJECTS.

- (a) TABULATING SYSTEMS.—Thorough knowledge of the capabilities and limitations of tabulating equipment and of the capacity of the installation in both machine and manual operations.
- (b) FLOW OF WORK.—Thorough knowledge of both machine and manual operations in the installations to which assigned and a good working knowledge of the operations and records of offices which supply source data to or are served by the tabulating installations.
- (c) CARDS, FORMS, AND REPORTS.—Thorough knowledge of the cards, forms, and reports used or prepared by the machine and manual operations of the installation.
- (d) CORRESPONDENCE AND SUPPLIES.—General knowledge of Navy correspondence, filing system, procedure for the requisitioning and maintenance of supplies, and of common methods for the collection and computation of source data.
- (e) D-5212.05 (3) (B).

D-5212.06. Specialists (M)—(Mail Clerks).

(1) SPECIALIST (M), THIRD CLASS.

(A) PRACTICAL FACTORS.

- (a) D-5204 (1).
- (b) MAIL SERVICES.—Demonstrate ability to perform all mail services required for efficient operation of a Navy post office serving less than 1,000 persons, including the transaction of money-order business, registry service, stamp sales, and handling of insured mails.
- (c) POSTAGE RATES.—Demonstrate ability to determine classes of mail and proper rates of postage chargeable for their transmission, including parcel-post zones.
- (d) DISTRIBUTING AND DISPATCHING MAIL.—Demonstrate ability to perform rapid and accurate distribution of incoming mail and dispatch of outgoing mail for activity served.
- (e) REQUISITIONS.—Demonstrate ability to prepare requisitions for postal supplies and equipment.
- (f) DIRECTORY SERVICE.—Demonstrate ability to maintain and perform directory service for incorrectly addressed or undeliverable mail.
- (g) HANDWRITING.—Demonstrate ability to write neatly and legibly.

(B) EXAMINATION SUBJECTS.

- (a) NAVAL MAIL SERVICE.—Have a thorough knowledge of the pamphlet, *The Navy Mail Service*, Edition 1938, and changes thereto. Know those portions of the *Postal Laws and Regulations* and *Postal Guide* that relate to mail service in the Navy.
- (b) NAVAL CORRESPONDENCE.—Know the classes of naval correspondence and the regulations governing their transmission by mail.
- (c) SECURITY.—Be familiar with the general security requirements for handling mail.
- (d) ORGANIZATION.—Know the organization of the unit served by the Navy post office in which employed.
- (e) SPELLING.—Be able to spell commonly known geographical locations.
- (f) D-5203.

(2) SPECIALIST (M), SECOND CLASS.

(A) PRACTICAL FACTORS.

- (a) MAIL SERVICES.—Demonstrate ability to perform all mail services required for efficient operation of a Navy post office serving between 1,000 and 2,000 persons, providing all normal postal facilities.
- (b) SUPERVISION.—Demonstrate ability to supervise properly the functions of the office and work of assistant mail clerks.
- (c) DISPATCH PREPARATION.—Demonstrate ability to prepare mail for dispatch by railway mail service or for foreign dispatch by air or surface.
- (d) INQUIRIES, CLAIMS, AND COMPLAINTS.—Demonstrate ability to handle inquiries, claims, and complaints relating to mail service.
- (e) D-5212.06 (1) (A).

(B) EXAMINATION SUBJECTS.

- (a) MAIL SCHEDULES.—Know the local mail schedules for air, rail, and surface movements.
- (b) NAVAL MAIL SERVICE.—Know those portions of the *Bureau of Naval Personnel Manual* and *U. S. Navy Regulations* that pertain to the naval mail service and Navy mail clerks. Know the current regulations promulgated by the Navy Department and local commands regarding mail service.
- (c) D-5212.06 (1) (B).

(3) SPECIALIST (M), FIRST CLASS.

(A) PRACTICAL FACTORS.

- (a) MAIL SERVICES.—Demonstrate ability to perform all mail services required for efficient operation of a Navy post office serving over 2,000 persons.
- (b) SUPERVISION.—Demonstrate ability to supervise properly the functions of each particular job in the office and to distribute work among assistant mail clerks for the efficient operation of the office.
- (c) RECORDS AND FORMS.—Demonstrate ability to prepare bonding forms, oaths of office, request for establishment of postal facilities or discontinuance of postal facilities, and nomination or revocation of appointment of mail clerks.
- (d) D-5212.06 (2) (A).

(B) EXAMINATION SUBJECTS.

- (a) CENSORSHIP REGULATIONS.—Know those portions of the *Censorship Regulations* that pertain to handling mail and messages by mail clerks.
- (b) ORGANIZATION.—Know the organization of ships or shore stations, units of the fleet and aircraft organization, including divisions, squadrons, groups, wings, forces, fleets, and administrative commands.
- (c) NAVAL COMMUNICATIONS.—Know the regulations governing the sending of messages and accounting for naval communication funds.
- (d) V-MAIL.—Know the functions of the V-mail system.
- (e) D-5212.06 (2) (B).

(4) CHIEF SPECIALIST (M).

(A) PRACTICAL FACTORS.

- (a) MAIL SERVICES.—Demonstrate ability to perform all mail services required for the efficient operation of any Navy post office, regardless of size. Know how to organize and establish complete postal facilities for new stations or for units of the fleet.
- (b) SUPPLIES AND EQUIPMENT.—Demonstrate ability to estimate the