

ASSIGNMENT 3

Textbook Assignment: Water System, Trim and Drain System, Air Systems, and Main Hydraulic System—Chapters 9-12.

1. (TRUE/FALSE) Sea water is used in many systems aboard the submarine because it can simply be pumped from outside the hull
 1. True
 2. False
2. Water enters and exits fresh water tanks via
 1. temporarily connecting fire hoses when needed.
 2. clear plastic piping so flow can be determined.
 3. fresh water filling and transfer lines.
 4. cast iron segmented piping.
3. There are ____ main fresh water tanks and ____ emergency fresh waters tanks connected to the fresh water system.
 1. 4, 3
 2. 2, 4.
 3. 8, 3.
 4. 3, 5.
4. Where is the 130-gallon emergency tank located?
 1. Forward torpedo room.
 2. Forward battery compartment.
 3. Control room.
 4. After torpedo room.
5. (TRUE/FALSE) There are two emergency fresh water tanks that are not connected to the fresh water system.
 1. True
 2. False
6. The fresh water filling valve is located in:
 1. Forward torpedo room hatch
 2. Gun access hatch
 3. Port side of the bridge
 4. After torpedo room hatch
7. One place to measure the quality of the fresh water would be the
 1. try cocks on the after bulkhead of the forward torpedo room.
 2. access port on the No. 1 fresh water tank.
 3. electric salinity sensor in the fresh water main.
 4. dip stick in the port emergency water tank.
8. The cross connection valve between the fresh water and battery fresh water system is located in the
 1. forward torpedo room.
 2. officer's pantry.
 3. forward battery well.
 4. overhead of the control room..
9. (TRUE/FALSE) In the after engine room, the fresh water main is connected to the engine cooling system, purifiers and evaporator No. 3.
 1. True
 2. False.
10. There are two 25-gallon water heaters located in the
 1. forward and aft torpedo rooms.
 2. officer's and crew's berthing.
 3. pantry and scullery.
 4. forward and after battery compartments.
11. Corrosion and breakdown of battery cells is caused by
 1. impurities in the battery water.
 2. improper cooling of the water from the distillers before it is added to cells.
 3. too high a pressure of water added to cells.
 4. water not added frequently enough to keep the battery plates covered.

12. The battery water tanks can be filled from a cross connection valve to the fresh water system or from the
1. torpedo firing valve supply tanks.
 2. the distilling plant.
 3. emergency water tanks.
 4. auxiliary sea water system.
13. (TRUE/FALSE) The coffee urn is connected directly to the fresh water system.
1. True
 2. False
14. The scuttlebutt is a
1. submarine type garbage disposer.
 2. funnel the distiller brine dumps into.
 3. common deck drain.
 4. drinking fountain.
15. There is a lavatory in the commanding officer's stateroom. Another name for a lavatory is a
1. sink.
 2. toilet.
 3. experimental cabinet.
 4. tri-way valve.
16. (TRUE/FALSE) The expulsion type head discharges directly overboard and is subject to sea pressure.
1. True
 2. False..
17. Use of fresh water on a fleet type submarine is approximately _____ gallon per week.
1. 4000.
 2. 6000.
 3. 8000.
 4. 10000.
18. (TRUE/FALSE) The distilling action uses electrolysis to remove salt from sea water.
1. True
 2. False.
19. The water supply for the distillers comes from
1. torpedo tube drain system.
 2. bridge trunk flood valve.
 3. main motor circulating system.
 4. auxiliary sea water system.
20. (TRUE/FALSE) The vapor in the still is cooled by the fresh water distillate cooling system.
1. True
 2. False.
21. In a vapor compression still, the vapor condenses because
1. its boiling point is lower than the feed water when compressed.
 2. its boiling point is higher than the feed water when compressed.
 3. fresh water boils at a higher temperature than salt water.
 4. compressing the vapor causes it to condense regardless of the temperature.
22. Incoming feed water to the still is partially heated by
1. condensed fresh water.
 2. heat exchanger in the motor cooling system.
 3. exchanging heat with the concentrated brine exiting the still.
 4. pressure drop on the outlet of the salt water supply pump.
23. The percentage of heat loss from condensate out of the total heat loss is
1. 3.5%
 2. 11.3%
 3. 12.25%
 4. 15.7%
24. (TRUE/FALSE) Fresh water taken aboard from shore services should have its purity verified because it cannot be run through the stills.
1. True
 2. False
25. The trim manifold is located in the _____ and has _____ and _____ sides.
1. forward torpedo room, supply, discharge
 2. aft battery compartment, high pressure, low pressure
 3. negative tank, top, bottom
 4. control room, suction, discharge.

26. The forward trim manifold is located in the
1. torpedo room.
 2. forward battery compartment.
 3. pump room.
 4. port side of officer berthing.
27. The _____ and _____ tanks can be blown or flooded directly from sea.
1. auxiliary ballast No. 1, auxiliary ballast No. 2
 2. forward trim, after trim
 3. negative, safety
 4. sanitary No.1, sanitary No. 2
28. What must be done to the trim pump before operating it?
1. Connect it to 400 Hz power.
 2. Shut the sea stop valve.
 3. Read the gage above the trim manifold.
 4. Prime the pump.
29. (TRUE/FALSE) The speed of the trim pump is controlled by a potentiometer located below the push button control
1. True
 2. False
30. The trim pump can be operated in series or parallel. Operating in series produces _____ the discharge pressure but _____ the volume of operating it in parallel.
1. twice, one half
 2. half, twice
 3. one third, three times
 4. four times, one fourth
31. The gage board in the control room contains "liquidometers." Liquidmoters measure
1. gallons per minute flowing into tanks.
 2. amount of water in each tank.
 3. pressure of water in each tank..
 4. temperature of water in each tank.
32. (TRUE/FALSE) The discharge valve on the trim manifold for a tank must be shut in order to flood the tank.
1. True
 2. False
33. The seals on the periscope shafts allow some water to enter the submarine. This water then drains into the
1. pump room bilge.
 2. control room bilge.
 3. forward battery compartment.
 4. crew's mess bilge.
34. (TRUE/FALSE) The drain pump like the trim pump must be primed before operating.
1. True
 2. False
35. The _____ system is able to perform more functions than any other system.
1. air
 2. trim
 3. drain
 4. propulsion
36. On the Fleet Type Submarine, air to fire torpedoes comes from the
1. 10-pound air system
 2. 225-pound system
 3. 600-pound system
 4. 3000-pound system
37. The high pressure air compressors are located in the
1. forward torpedo room
 2. pump room
 3. forward engine room
 4. after engine room
38. Which 3000-pound air bank is not located in the main ballast tanks?
1. No. 1
 2. No. 3
 3. No. 5
 4. No. 7
39. If the 600-pound reducing valve for the after torpedo impulse air system fails, in order to charge the system, you would
1. charge the system from the low pressure air compressors.
 2. cross connect the forward and after torpedo impulse air systems.
 3. return to port for repair of the reducing valve

4. use the bypass valve from the 3000-pound air service line.
40. (TRUE/FALSE) When surfacing the ship, the main ballast tanks can be emptied with high pressure air or pumped with the trim pump.
 1. True
 2. False
 41. When blowing the MBTs at deeper depths the hammer valve should be opened
 1. fully to overcome the increased pressure.
 2. fully then closed slowly as the depth of the submarine decreases.
 3. at a ratio of 15% of the depth in 100 foot increments.
 4. slowly to prevent the pressure in the 600-pound manifold increasing above safe working pressure.
 42. If pressure in the 225-pound air system rises above 250 pounds you should first
 1. let the sentinel valve open and then if necessary to reduce the pressure open the two relief valves.
 2. shut the Grove valves shut so air is routed back into the 3000-pound air system
 3. open the two relief valves and then open the sentinel valve.
 4. open the bypass valve to the torpedo charging flask, then open the relief valve.
 43. Fresh water is not pumped to the galley, heads, lavatories or showers. The tanks are pressurized to ____ psi to cause the water to flow through the fresh water piping system.
 1. 10
 2. 12
 3. 15
 4. 100
 44. The hose connection for the ship's diver is located in the
 1. control room.
 2. crews mess.
 3. forward engine room.
 4. escape trunk.
 45. There is a relief valve for the sanitary tank in the crew's quarters set at 105 psi. Based on a maximum pressure of 105 psi, at what depth would it no longer be possible to blow the sanitary tank to sea? (figure $14.7 \text{ psi} + ((\text{depth in feet}) * 0.445 \text{ psi})$)
 1. 100 feet
 2. 200 feet
 3. 300 feet
 4. 400 feet
 46. (TRUE/FALSE) Lubricating oil for the main engines is fed by the 13 psi air manifold.
 1. True
 2. False
 47. There are pressure gages on either side of watertight bulkheads because
 1. there are usually different pressures in compartments
 2. compartments are tested for leaks from sea on a daily basis.
 3. opening a hatch when the delta-P is high between compartments can cause injury/death.
 4. watch standers must log readings and a supervisor can see if the gages have not been recorded.
 48. The 10-pound main ballast tank blowing system uses
 1. air from the 10-pound air banks located in the forward engine room.
 2. high pressure centrifugal pumps.
 3. the low-pressure blower located in the pump room.
 4. air from the 225-pound air banks reduced to ten pounds.
 49. The list control dampers are used to
 1. change the rate at which the forward or after ballast tanks are emptied
 2. change the rate at which the port or starboard ballast tanks are emptied.
 3. controls the order of how ballast tanks are emptied.
 4. dampens the rate at which ballast tanks are emptied.

50. The salvage air system is used to
1. remove water from flooded compartments or the entire submarine if necessary.
 2. blow the main ballast tanks with air from an external source.
 3. recover high pressure air after it has been used to blow the main ballast tanks.
 4. recharge the 3000-pound air flasks.
51. If you wanted to blow an individual compartment using the ship's air systems, you would use the
1. 10-pound low pressure blower.
 2. 225-pound air system.
 3. 600-pound air system.
 4. 3000-pound air system
52. Why do the external valve deck plates have special lugs for touch identification?
1. Divers often go blind after many dives.
 2. Valves are hard to reach inside the superstructure and touch identification helps.
 3. Foreign divers could not read English.
 4. In heavily silted water visibility could be zero and the only way to determine the valve would be by touch.
53. One advantage of hydraulic power over electric is that it
1. is easier to operate.
 2. is quieter.
 3. takes less power.
 4. works at deeper depths.
54. (TRUE/FALSE) Hydraulic systems require a separate lubricating system because of the corrosive nature of hydraulic oil.
1. True
 2. False
55. The rudder on a submarine is part of the _____ hydraulic system.
1. steering
 2. main
 3. bow planes tilting
 4. stern planes tilting
56. (TRUE/FALSE) On the Fleet Type Submarine, the periscopes and antenna masts are still raised and lowered electrically.
1. True
 2. False
57. Hydraulic power is supplied by the IMO pumps. "IMO" stand for:
1. Intermeshed Mechanically Operated
 2. Internal Machine Oriented
 3. Indexed Marginal Operation
 4. The names of founders of the manufacture company, Ingstrom and Montelius
58. In the IMO pump there is/are _____ power rotor(s) and _____ idler rotor(s) that rotate(s) in the _____ direction as the power rotor.
1. one, one, opposite
 2. one, two, opposite
 3. one, three opposite.
 4. two, two, opposite.
59. The drip cup is not shown in Figure 12-1 but is described in the text. The purpose of the drip cup is to
1. return oil for the balancing flow system.
 2. catch oil that leaks past the block stop pin.
 3. catch oil that that gets past the metallic packing rings around the drive shaft.
 4. catch oil that leaks around the discharge port gasket.
60. (TRUE/FALSE) The main hydraulic supply tank is only filled to 30-gallons out of 50-gallon capacity because the tank is sized for future additional equipment.
1. True
 2. False
61. When several hydraulically powered systems are used simultaneously, the _____ supplements the IMO pump to maintain pressure in the supply lines?
1. accumulator
 2. supplemental pressure tank
 3. supplemental IMO pump
 4. addition of high pressure air to the system

62. Normal operations of hydraulic systems are done from the _____ in the _____.
1. operators panel, pump room
 2. switch valve manifold, fwd engine room
 3. auxiliary control panel, fwd torpedo room
 4. control station, control room
63. Normal bow planes rigging is used to
1. put the planes in a vertical position for under ice surfacing.
 2. extend or retract the planes.
 3. make minor adjustments in the angle on the planes.
 4. rig the planes for electrical operation.
64. Oil to supply the IMO pump comes from the supply tank and directly from the
1. equipment return piping.
 2. hydraulic accumulator.
 3. automatic bypass valve vent.
 4. pilot valve supply.
65. The pilot valve is open when the accumulator is discharging. The automatic bypass valve opens by
1. pressure from the pilot valve.
 2. pressure from the non-return valve.
 3. pressure directly from the accumulator.
 4. opening of the throttle valve.
66. What must be done before starting the main hydraulic plant?
1. Shut the pilot valve.
 2. Discharge pressure on the supply tank.
 3. Open the manual bypass valve.
 4. Discharge the accumulator pressure.
67. (TRUE/FALSE) Venting the hydraulic lines should be done when there is no pressure on the system.
1. True
 2. False
68. When a flood and vent valve is in the emergency position
1. the valve can be operated with emergency hydraulic power.
 2. the valve can be operated by hand.
 3. the valve can be operated with high pressure air.
 4. the lines to the valve are shut off from the hydraulic operating cylinder.
69. (TRUE/FALSE) The flood valves on the safety and negative tanks must be operated by hand.
1. True
 2. False
70. To shut a hydraulic vent valve
1. move the tie rods in sequential order.
 2. reverse the flow of fluid in the cylinder.
 3. move the crosshead from vertical to horizontal.
 4. move the tie rods outward.
71. The connection between the periscope and the hydraulic pistons is a
1. collar.
 2. x-brace.
 3. sleeve.
 4. yoke.
72. (TRUE/FALSE) The hydraulic pistons on the periscope only have oil on one side of the pistons.
1. True
 2. False
73. What makes the antenna hoist have an easy stop at the bottom?
1. The operator must slowly close the control valve.
 2. The automatic trip arrangement.
 3. Double acting cylinders.
 4. Tapered grooves cut toward the underside of the piston head.
74. (TRUE/FALSE) The echo ranging and sound detection devices are supplied by the forward service lines.
1. True
 2. False

75. In order to operate a torpedo tube outer door by hand

1. the operating cylinder must be drained.
2. the system must be cross-connected to the high press air system.
3. the control valve must be in the hand position.
4. the operating lug must be in the neutral position.