

AUXILIARY EQUIPMENT PART I

Attempt ALL questions

Marks for each part question are shown in brackets

- ✓1. (a) Sketch a section through a direct emergency bilge suction valve. (8)
(b) Describe how the valve sketched in part (a) is tested. (2)
- ✓2. With reference to a centrifugal pump used for ballast/emergency bilge purposes, explain EACH of the following:
(a) the purpose of the volute; (3)
(b) the purpose of the wear rings and why the clearance is critical; (5)
(c) the need for a priming device. (2)
- ✓3. Sketch a system that is capable of supplying compressed air suitable for use in pneumatic control equipment. (10)
- ✓4. With reference to hydraulic systems:
(a) describe how the system is checked for water contamination, after an extended period of shut down; (8)
(b) state TWO sources of water contamination. (2)
- ✓5. With reference to steering gears, explain the meaning of EACH of the following:
(a) 100% redundancy; (5)
(b) single failure criteria. (5)
- ✓6. Describe the advantages of using water jets instead of conventional propellers for vessel propulsion. (10)
- ✓7. Sketch an arrangement for the aft seal of an oil lubricated stern tube bearing. (10)

- ✓8. With reference to propulsion shaft intermediate bearings of the plain bearing type, explain EACH of the following:
- (a) how change of alignment due to vessel condition is allowed for; (2)
 - (b) why the shaft must be able to move longitudinally; (4)
 - (c) why the aftmost bearing requires a complete bush but other bearings may have the bush only in the lower half. (4)
- ✓9. With reference to a.c. generators:
- ✓(a) state why direct current is used for excitation; (2)
 - (b) state THREE factors that determine the output voltage; (3)
 - (c) explain how the output voltage is controlled and adjusted. (5)
- ✓10. Outline the necessary precautions, as stated in the Code of Safe Working Practices for Merchant Seamen, for working near live electrical equipment, when it is essential for the safety of the ship or for testing purposes. (10)