

AUXILIARY EQUIPMENT PART I

Attempt ALL questions

Marks for each part question are shown in brackets

1. With reference to thermostatic three-way valves:
 - (a) describe how they operate; (4)
 - (b) explain how they are tested; (3)
 - (c) state THREE examples of their use in the systems of a diesel engine. (3)

2. With reference to positive displacement pumps:
 - (a) describe, with the aid of a sketch, the operation of a pulsation damper; (6)
 - (b) explain why some positive displacement pump types do not require pulsation dampers. (4)

3. Explain the hazards to personnel with rupture of compressed air lines and fittings. (10)

4. With reference to pneumatic control systems, explain EACH of the following:
 - (a) why moisture is undesirable; (4)
 - (b) why oil is generally undesirable; (3)
 - (c) why oil may be intentionally introduced into parts of the system. (3)

5. With reference to an electro-hydraulic steering gear, explain EACH of the following:
 - (a) how steering may be maintained should the telemotor system fail; (5)
 - (b) how steering may be achieved should there be total failure of the hydraulic system. (5)

6. Describe, with the aid of a sketch, the operation of a transverse thruster that is hydraulically driven. (10)

7.
 - (a) Explain how propeller thrust is transmitted to a vessel's hull. (3)
 - (b) Describe the mounting arrangements of a thrust block to the hull. (4)
 - (c) Explain why the clearance between the thrust block pads and collar is critical. (3)

8. With reference to **stern bearings**, state the **advantages** and **disadvantages** of using **EACH** of the following:
- (a) white metal; (5)
 - (b) polymer or composite. (5)
9. With reference to the electrical side of an a.c. generator set:
- (a) state how it is safely isolated; (3)
 - (b) outline the routine maintenance that should be carried out. (7)
10. (a) State FIVE devices fitted to a main distribution switchboard in order to protect a.c. generators that can be operated in single or parallel mode. (5)
- (b) Explain why EACH device stated is needed. (5)

