

## AUXILIARY EQUIPMENT PART II

Attempt ALL questions  
Marks for each part question are shown in brackets

2. Describe, with the aid of sketches, how an axial piston pump can vary the volume of liquid it displaces. (10)
3. Describe, with the aid of a sketch, a hydraulic rack and pinion starting system, labelling the MAIN components. (10)
3. With reference to storage batteries, explain EACH of the following: ✓
- (a) the term UPS; (3)
  - (b) the operation of an inverter, stating why it may be required; (4)
  - (c) the term 150 Ah. (3)
4. With reference to a 3-phase motor supplied with a six terminal connection without links, describe, with the aid of sketches, how the phase ends can be identified and the motor connected to run in permanent delta mode. (10)
5. Sketch an indirect expansion, chilled water air conditioning plant, labelling the MAIN components. (10)
6. With reference to blended refrigerants, explain EACH of the following terms, stating the refrigerant state required for charging: —
- (a) azeotrope; (3)
  - (b) zeotrope; (4)
  - (c) near-azeotrope. (3)
7. With reference to the visual inspection of lifting gear before use, state the removal from service criteria for EACH of the following when visually inspecting before use: ✓
- (a) shackles; (5)
  - (b) hooks. (5)
8. Note: They are within inspection dates, are of the correct SWL and clearly labelled.

8. Explain the requirements for the stowage and operation of LPG cylinders. ✓ (10)

9. With reference to surface preparation for the painting of a vessel's hull in dry-dock, list the advantages and disadvantages of EACH of the following methods: ✓

(a) abrasive blasting; (5)

(b) hydroblasting. (5)

10. With reference to a vessel's hull: ✓

(a) explain the meaning of EACH of the following:

(i) dynamic stress; (3)

(ii) static stress; (3)

(b) state TWO examples of EACH type of stress explained in part (a). (4)