

**AUXILIARY EQUIPMENT PART II**

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) Explain why a hydraulic actuator is preferred for a vessel's stabiliser over an electrical actuator. (5)
- (b) Sketch a hydraulic circuit for a single stabiliser, suitable for a constant pressure system. (5)
2. With reference to speed control of ac induction motors, explain the function of Pulse Width Modulation (PWM). (10)
3. With reference to induction motor starters:
  - (a) state when a STAR/DELTA starter may be required; (2)
  - (b) describe the operation of a STAR/DELTA starter; (5)
  - (c) explain why the motor configuration is changed from STAR to DELTA. (3)
4. (a) State FOUR properties of refrigeration oil. (4)
- (b) Describe the operation of an Oil Separator in a refrigeration system. (4)
- (c) State reasons for the employment of an oil separator in refrigeration vapour compression units. (2)
5. State THREE different methods used to detect a refrigerant gas leak, explaining EACH method. (10)
6. With reference to a reciprocating air compressor:
  - (a) State THREE possible causes of a restricted air inlet passage of an air compressor. (3)
  - (b) Explain the problems that may arise when running an air compressor with a restricted air inlet passage. (7)

7. (a) A crane is being fitted to deploy and recover a load from a vessel. State the conditions which the crane must comply with before being used. (7)
- (b) State the information entered on a Proof Load Test certificate. (3)
8. Describe the procedure that should be followed if an outboard motor has been submerged in sea water. (10)
9. With reference to the International Convention for the Safe and Environmentally Sound Recycling of Ships:
- (a) state the operational requirements for compliance; (4)
- (b) list FOUR prohibited hazardous materials; (4)
- (c) list TWO hazardous materials whose use should be restricted. (2)
10. With reference to a steel hulled vessel, explain THREE functions of the protective paint applied to the underwater part of the hull. (10)