AUXILIARY EQUIPMENT PART II

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

1. Describe, with the aid of sketches, the operating principle of an axial variable delivery hydraulic pump. (10)

2. With reference to a crane operated by a constant pressure hydraulic system incorporating unidirectional, fixed displacement pumps that run continuously, explain EACH of the following:

   (a) the purpose of the accumulator; (2)

   (b) how the hydraulic pressure is regulated; (2)

   (c) how the speed and direction of the hoist motor is varied; (3)

   (d) how the torque available from the hoist motor can be varied. (3)

3. 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)

4. With reference to paralleling and load sharing of generators, explain EACH of the following:

   (a) the possible causes of no voltage indication on start up of a stand-by generator; (2)

   (b) the purpose of the check synchroniser; (2)

   (c) the reason for the incoming machine to be running slightly faster than the busbar frequency at the instant of closing the incoming breaker; (2)

   (d) how equal kW load sharing is maintained; (2)

   (e) why the power factors may be different even though the kW loads are equal. (2)

5. With reference to air conditioning systems, state the meaning of EACH of the following terms:

(a) heating load; (1)

(b) cooling load; (1)

(c) sensible heat; (2)

(d) latent heat; (2)

(e) absolute humidity; (2)

(f) specific humidity. (2)

6. Sketch a line diagram of a free standing air conditioning unit, showing the direction of flow, position of safety cut outs, oil separator and charging point. (10)

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)

7. *Note: They are within inspection dates, are of the correct SWL and clearly labelled.*

8. Describe the safety requirements for the electrical installation in a large locker on deck, designated for the carriage of petrol, or vehicles with fuel in their tanks. (10)

9. With reference to transverse stresses in a vessel's hull:

(a) state the cause of the stress when the vessel is:

(i) floating in still water; (1)

(ii) being acted on by waves; (2)

(iii) drydocked. (1)

(b) state the areas where the stress is a maximum when the vessel is:

(i) floating in still water; (1)

(ii) drydocked; (1)

(c) describe the structure that resists the stress. (4)

10. With reference to surface preparation for the painting of a vessels hull in dry-dock, list the advantages and disadvantages of EACH of the following methods:

(a) abrasive blasting; (5)

(b) hydroblasting. (5)