

**AUXILIARY EQUIPMENT PART II****Attempt ALL questions****Marks for each part question are shown in brackets**

1. With reference to a pressure compensated variable displacement, swash plate pump, explain FOUR different possible causes of reduction in performance.  
  
*Note: The filter has been cleaned, the system is in good condition and there are no visual signs.* (10)
  
2. (a) Sketch the hydraulic symbol for a 4:3 directional control valve. (3)  
(b) Describe the operation of EACH of the following hydraulic valves:
  - (i) directional control valve; (2)
  - (ii) speed control valve; (2)
  - (iii) brake valve. (3)
  
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.c. 3 phase motors:
  - (a) explain the meaning of the term soft starter; (4)
  - (b) describe, with the aid of a diagram, the operation of a solid state soft starter. (6)
  
5. (a) Explain EACH of the following terms with reference to refrigeration gases:
  - (i) the Green House Effect; (3)
  - (ii) ozone depletion. (3)(b) Describe the effect of undercharge in a refrigeration system. (4)

6. Describe, with the aid of a sketch, how the relative humidity may be controlled in an Air Conditioning System. (10)
7. (a) State the maximum time periods between EACH of the following lifting equipment requirements:
- (i) thorough examination and inspection; (1)
  - (ii) testing. (1)
- (b) Describe the inspection routine for lifting gear. (6)
- (c) State the procedure for recording the results of the inspection and tests. (2)
8. With reference to the storage of volatile fuels, describe the construction and placement requirements of the storage tanks for aviation fuel, including tank ventilation. (10)
9. (a) State the purpose of the collision bulkhead and the regulations appertaining to its dimensions and position. (4)
- (b) Explain the difference between A, B and C class bulkheads. (6)
10. (a) Explain what is meant by the term *pounding* as applied to a vessel being driven hard in a seaway. (3)
- (b) Explain how *panting* may often occur at the same time as *pounding* in heavy seas. (3)
- (c) Describe how the hull is strengthened to resist *panting* and *pounding*. (4)