

Attempt ALL questions

Marks for each part question are shown in brackets

1. With reference to the hydraulic system shown in the figure:

- identify the components, indicated A to E; (5)
- describe the operation of the system when B is moved in the downward direction. (5)

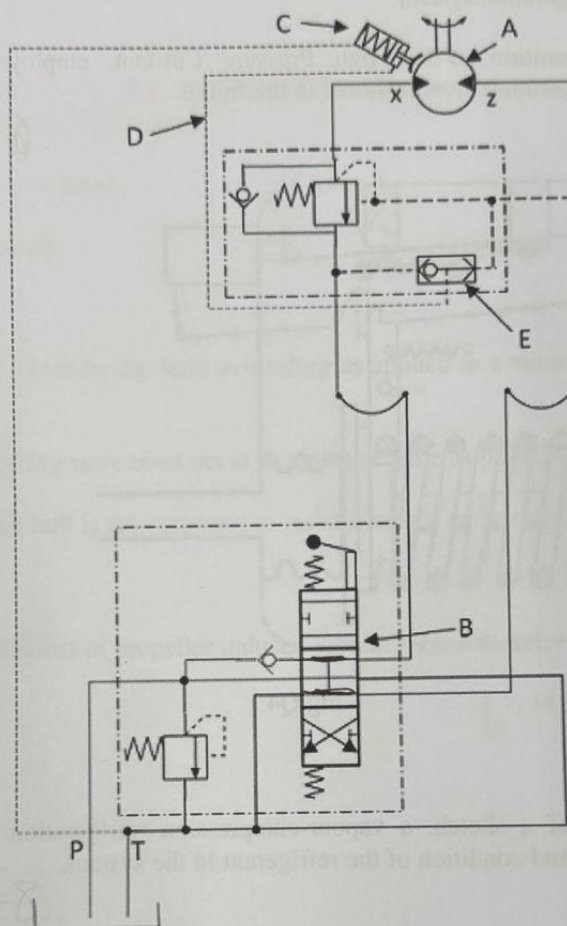


Fig Q1

2. With reference to a 440 Volt, 3-phase motor supplied with six terminal connections in the terminal box:

- sketch a Delta connection, showing the relationship between phase and line voltages; (2)
- sketch a Star connection, showing the relationship between phase and line voltages; (2)
- state the relative speed of both connections; (2)
- sketch and label the terminal link connections so the motor will run in permanent Delta mode. (4)

3. With reference to a solid state (inverter) starter for a 3 phase induction motor: (4)

- (a) explain the function of this system; (6)
- (b) list the advantages and disadvantages when compared to conventional starting methods e.g. DOL. 6-9 *

4. (a) State THREE reasons for the operation of a *High Pressure Cut-out* in a vapour compression refrigeration system. (3)

- (b) Describe the operation of the High Pressure Cut-Out, employed in a vapour compression refrigeration system shown in the figure. (7)
- 6-9

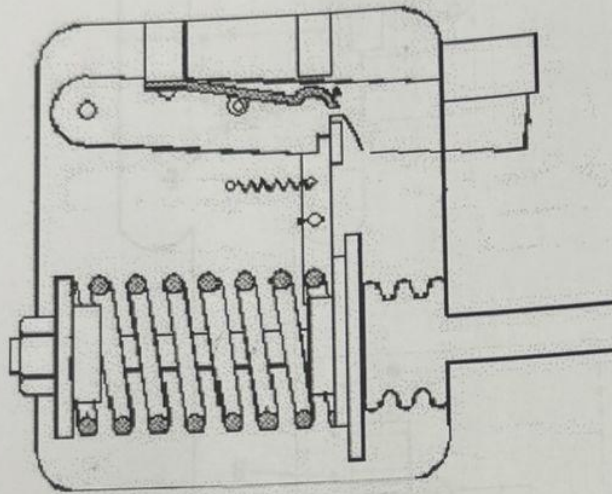


Fig Q4

5. Describe, with the aid of a sketch, a vapour-compression refrigeration cycle, showing clearly the physical state and condition of the refrigerant in the system. (10)
- 8-10

6. (a) Describe the precautions to be taken in the production of compressed air for diving equipment. (5)
- (b) List the routine maintenance to be undertaken, to ensure the safe operation of Compressed Air Diving Equipment (SCUBA). (5)

7. (a) State the maximum time periods between EACH of the following lifting equipment requirements:
- (i) thorough examination and inspection; (1)
 - (ii) testing. 8-10 (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 Open Flame Gas Installation, describe the safety requirements for the installation of EACH of the following:
- (a) cylinders and attachments; (5)
 - (b) fittings and pipework. 8-10 (5)
9. (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*. 8-10 (4)
10. Explain the cause and effect of propeller induced vibration on a vessel. (10)

6-9