

CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

**EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF
MARITIME AND COASTGUARD AGENCY**

**SMALL VESSEL CHIEF ENGINEER UNLIMITED
SMALL VESSEL CHIEF ENGINEER LIMITED**

059-02 - AUXILIARY EQUIPMENT PART II

FRIDAY, 11 June 2021

1400-1600 hrs

Examination paper inserts:

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Notes for the guidance of candidates:

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| <ol style="list-style-type: none">1. Candidates should note that 100 marks are allocated to this paper. To pass candidates must achieve 50 marks.2. Non-programmable calculators may be used3. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer. |
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Materials to be supplied by examination centres:

Candidate's examination workbook

AUXILIARY EQUIPMENT PART II

Attempt ALL questions

Marks for each part question are shown in brackets

1. Explain the operation of the hydraulic system shown in figure. (10)

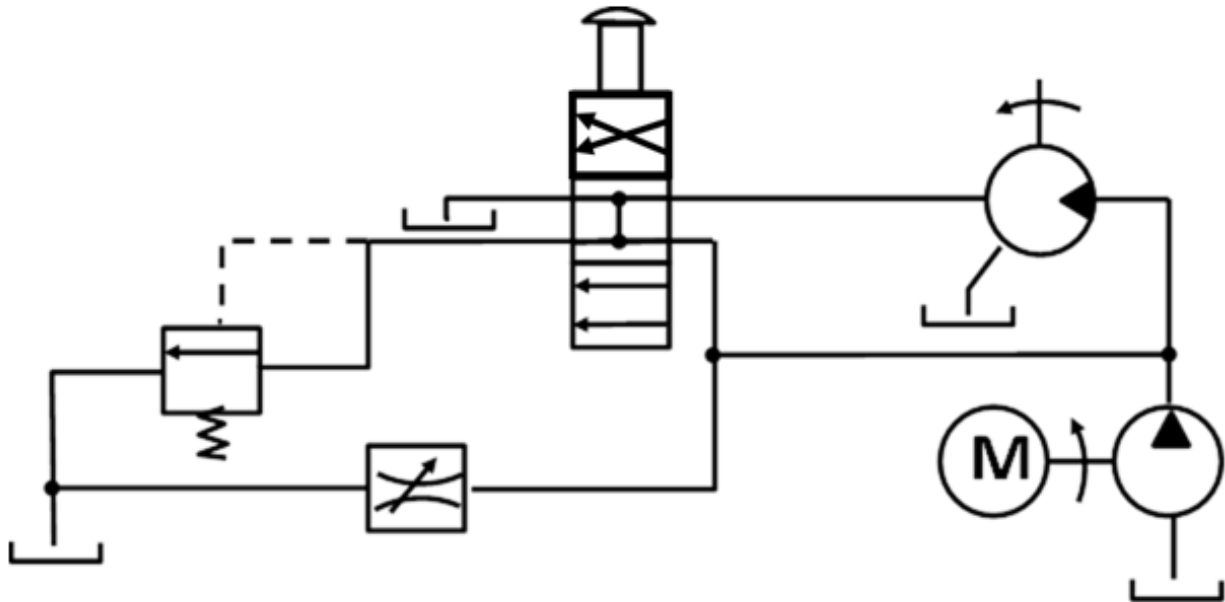


Fig Q1

2. 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)
3. Explain what happens to the output voltage of an a.c. generator from sudden application of a large load to a steady state condition. (10)
4. Describe the indications of, and the remedies for, an undercharge on a refrigeration system. (10)
5. Explain, with the aid of a sketch, the procedure for *vapour* re-charging of a refrigeration plant. (10)
6. Describe, with the aid of a sketch, a three-stage air compressor system, suitable for compressed air diving equipment. (SCUBA). (10)

7. With reference to the Code of Safe Working Practices for Merchant Seamen and maintenance of lifting equipment:
- (a) state the interval between testing and who should carry out the testing; (2)
 - (b) state the name of the document where details of the vessel's lifting gear is kept; (1)
 - (c) state the meaning of SWL; (1)
 - (d) state the possible reasons for needing to take a piece of lifting equipment out of service, explaining the measures to be taken before it can be returned to service. (6)
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 longitudinal stresses in a vessel's hull:
- (a) state the cause of the stress; (3)
 - (b) state the areas where the stress is a maximum; (3)
 - (c) describe the structure that resists the stress. (4)
10. 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)