

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, 27 November 2020

1400-1600 hrs

Examination paper inserts:

Worksheet Q3(a)

Notes for the guidance of candidates:

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 used
3. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.

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. 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. Describe, with the aid of a sketch, a hydraulic rack and pinion starting system, labelling the MAIN components.

(10)

3. (a) On the Worksheet, sketch how an a.c. motor would be connected in EACH of the following:

(i) star;

(3)

(ii) delta.

(3)

- (b) Explain why an a.c. motor may need a star-delta starter.

(4)

4. With reference to the Electrical Circuit Diagram:

(a) state the purpose of this circuit;

(2)

(b) describe the functions the areas marked within the dotted lines numbered 1, 2, 3 and 4.

(8)

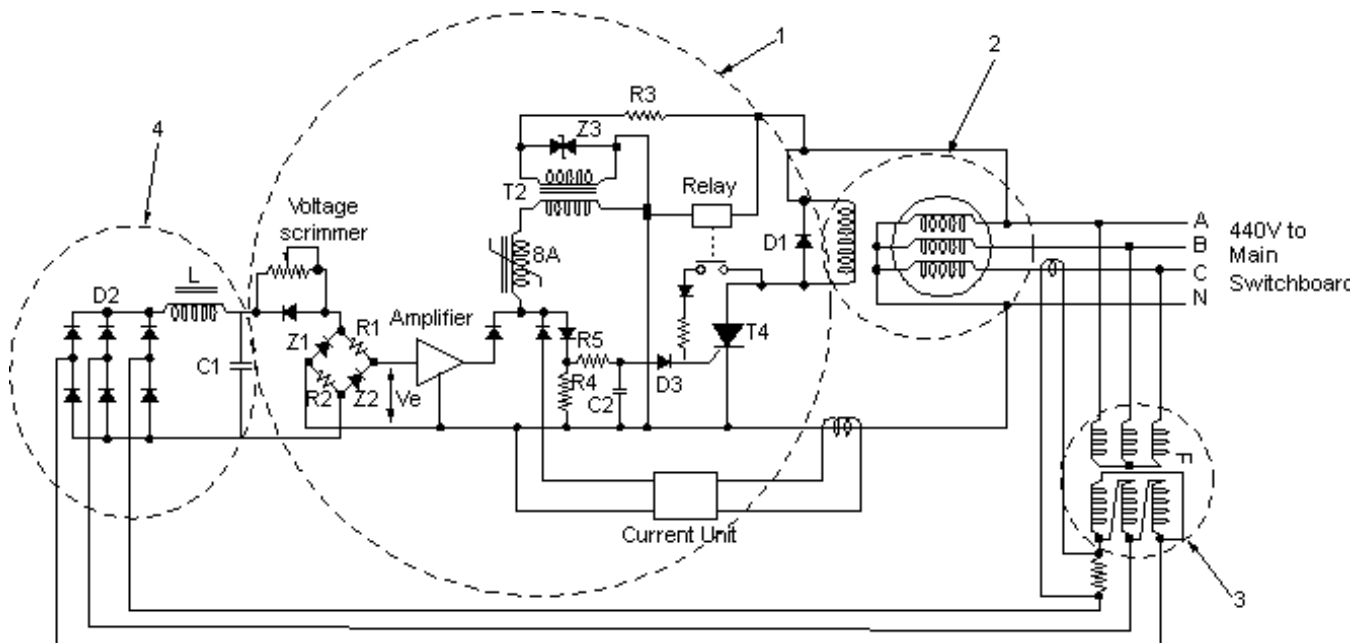


Fig Q4

5. With reference to refrigeration systems:
- (a) state the THREE basic laws of refrigeration; (6)
 - (b) state the location and method of re-setting of EACH of the following:
 - (i) the High Pressure cut out; (2)
 - (ii) the Low Pressure cut out. (2)
6. With reference to refrigeration systems, explain EACH of the following:
- (a) why air is undesirable; (3)
 - (b) how air may enter; (3)
 - (c) how air may be removed. (4)
7. (a) Describe TWO possible sources of contamination of compressed air used for breathing. (4)
- (b) State THREE contaminants that may be found in compressed air, outlining the effect of the contaminant on the user when the compressed air is used for diving (SCUBA) purposes. (6)

8. The lifting arrangement shown in the figure, has two slings, A, with a SWL of 5 tonnes, four slings, B, with a SWL of 2.5 tonnes with a ring and beam each of which have a SWL of 12 tonnes .
Explain the suitability or otherwise of this arrangement for lifting a generator engine, including flywheel, weighing 8.5 tonnes that has certified lifting points, 2 at each end of the entablature, 6 m apart.

(10)

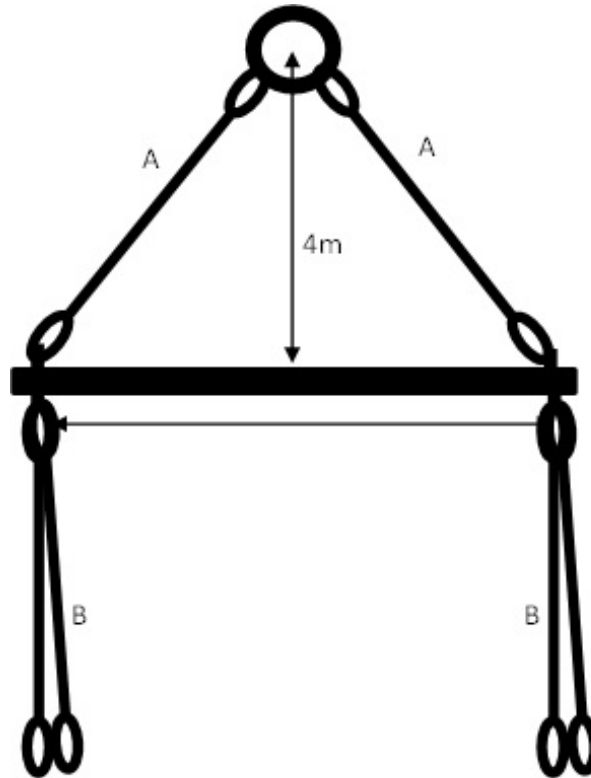


Fig Q8

9. Describe, with reasons, the features of watertight doors fitted to the weather deck. (10)
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)