

CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF
MARITIME AND COASTGUARD AGENCY
SMALL VESSEL SECOND ENGINEER

060-03 - AUXILIARY EQUIPMENT PART I

FRIDAY, 02 October 2020

1400-1600 hrs

Examination paper inserts:

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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 I

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) Sketch a cross-section of a relief valve suitable for use with a fuel supply pump. (6)
(b) Describe the operation of the valve sketched in part (a). (4)

2. Describe, with the aid of sketch, a system for priming a centrifugal pump using a priming pump driven from the centrifugal pump. (10)

3. Explain why EACH of the following may have fusible plugs fitted:
(a) air compressor; (5)
(b) air receiver. (5)

4. With reference to water contamination of hydraulic systems:
(a) state possible sources of water; (2)
(b) explain the possible consequences; (5)
(c) describe the actions to be taken should it be suspected. (3)

5. With reference to steering gears, explain the meaning of EACH of the following:
(a) 100% redundancy; (5)
(b) single failure criteria. (5)

6. With reference to propellers, explain EACH of the following:
(a) TWO advantages of having high skew; (5)
(b) TWO advantages of aft rake. (5)

7. Explain THREE advantages of hydraulically fitted shaft coupling bolts compared to parallel interference fit bolts. (10)

8. With reference to propulsion shaft intermediate bearings of the plain bearing type, explain EACH of the following:
- (a) how change of alignment due to vessel condition is allowed for; (2)
 - (b) why the shaft must be able to move longitudinally; (4)
 - (c) why the aftmost bearing requires a complete bush but other bearings may have the bush only in the lower half. (4)
9. (a) Sketch a line diagram of an emergency switchboard arrangement, labelling the MAIN components. (6)
- (b) Explain how main electrical power is restored to the emergency switchboard after a *blackout*, stating the precautions necessary. (4)
10. Describe the routine maintenance that should be carried out on the electrical side of an a.c. generator set. (10)