

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, 18 September 2020

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 I

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) Sketch a section through a 3-way mixer valve. (8)
(b) State an application for this type of valve. (2)

2. With reference to positive displacement pumps:
(a) describe, with the aid of a sketch, the operation of a pulsation damper; (6)
(b) explain why some positive displacement pump types do not require pulsation dampers. (4)

3. Sketch a system that is capable of supplying compressed air suitable for use in pneumatic control equipment. (10)

4. With reference to an air supply for pneumatic control systems:
(a) state THREE contaminants that may be present; (3)
(b) explain why the contaminants stated in part (a) are undesirable. (7)

5. Sketch a valve operated, rotary vane steering gear, showing the hydraulic system from the directional valve to the rotary vane unit. (10)

6. (a) State SIX advantages of controllable pitch propellers. (6)
(b) State FOUR disadvantages of controllable pitch propellers. (4)

7. With reference to stern bearings, state the advantages and disadvantages of using EACH of the following:
(a) white metal; (5)
(b) plastic. (5)

8. Describe the inspection of a main thrust bearing. (10)
9. (a) List FIVE safety precautions that need to be observed for the location and storage of a large bank of emergency batteries. (5)
- (b) Describe FIVE weekly routine maintenance tasks that need to be performed on a bank of lead acid battery cells. (5)
10. (a) Compare the effects of earth leakage occurring in an earthed distribution system and in an insulated distribution system. (6)
- (b) State the reasons why an instrument type earth leakage detector will be fitted in preference to simple earth lamps. (4)