

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, 09 November 2018

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. Non-programmable calculators may be used.2. 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. With reference to remotely operated quick closing valves:
 - (a) state their purpose; (2)
 - (b) state where they would be fitted; (3)
 - (c) describe how they are tested. (5)

2. With reference to a centrifugal pump used for ballast/emergency bilge purposes, explain EACH of the following:
 - (a) the purpose of the volute; (3)
 - (b) the purpose of the wear rings and why the clearance is critical; (5)
 - (c) the need for a priming device. (2)

3. Describe the internal and external inspection of an air receiver, outlining the safety precautions necessary. (10)

4. With reference to a windlass that is hydraulically operated by a variable displacement motor, explain the effect of changing EACH of the following:
 - (a) the flow rate of hydraulic oil; (4)
 - (b) the displacement of the motor. (6)

5.
 - (a) State the rudder movement required by SOLAS II-I, Reg 29. (5)
 - (b) Explain how it is ensured that the maximum movement stated in part (a) is not exceeded in an electro-hydraulic, ram type steering gear. (2)
 - (c) Explain how the steering gear system is protected from damage should the maximum movement be exceeded. (3)

6. With reference to controllable pitch propellers:
- (a) explain why they should maintain a small amount of pitch when in the neutral position; (3)
 - (b) state, with reasons, the failsafe position; (4)
 - (c) explain how pitch may be restored should hydraulic system failure occur. (3)
7. Whilst a single screw vessel is on passage it is noticed that an intermediate shaft bearing is running hot.
- (a) State FIVE possible causes. (5)
 - (b) Explain the procedure that should be followed in order to reach port for further investigation if there were no further causes. (5)
8. (a) State FIVE devices fitted to a main distribution switchboard in order to protect a.c. generators that can be operated in single or parallel mode. (5)
- (b) Explain why EACH device stated is needed. (5)
9. (a) Explain the term *single phasing*. (2)
- (b) State the effects on a motor of single phasing. (6)
- (c) State how single phasing may be protected against in the motor starter circuit. (2)
10. (a) Explain the meaning of the symbol



- (5)
- (b) Explain the term *flameproof enclosure*. (5)