

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, 05 November 2021

1400-1600 hrs

Examination paper inserts:

--

Notes for the guidance of candidates:

- | |
|--|
| <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. |
|--|

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 tank quick closing valves:
 - (a) describe, with the aid of sketches, TWO methods for remote actuation; (6)
 - (b) state where they would be fitted; (2)
 - (c) explain why they are fitted. (2)

2.
 - (a) Explain how cavitation damage occurs within a pump. (6)
 - (b) State, with reasons, TWO operational causes of increased cavitation within a pump. (4)

3.
 - (a) Sketch a starting air reservoir, labelling ALL mountings. (8)
 - (b) State TWO coatings that can be used to protect the interior surface of a large air reservoir against corrosion. (2)

4. With reference to air compressors and pneumatic control systems:
 - (a) state ONE advantage and ONE disadvantage of a compressed air system compared to a hydraulic system; (2)
 - (b) explain why it is desirable to remove moisture from the air; (2)
 - (c) explain why its desirable to limit oil carry over; (2)
 - (d) describe how EACH of the following is achieved:
 - (i) removal of moisture from the air; (2)
 - (ii) limiting of oil carry over. (2)

5. With reference to two ram steering gears which incorporate spherical bearings:
 - (a) sketch an arrangement of rams and tiller, including fittings; (6)
 - (b) explain why spherical bearings are required on the ram ends. (4)

6. With reference to a vessel with a single electro/hydraulic controllable pitch propeller, explain EACH of the following:
- (a) how manoeuvring may be maintained if the control system fails; (5)
 - (b) the action to be taken should the hydraulic system irreparably fail whilst on route and the blades assume zero pitch. (5)
7. With reference to main propulsion shaft hydraulic sleeve type couplings:
- (a) describe, with the aid of a sketch, the tightening procedure; (7)
 - (b) state how it is determined that the push fit is complete. (3)
8. (a) Explain, with the aid of sketches, how a new motor is aligned with an existing pump. (7)
- (b) State THREE checks which should be made before using the pump after the motor has been aligned. (3)
9. With reference to shore supplies:
- (a) state THREE necessary parameters that must be checked before connecting to the vessel's distribution system; (3)
 - (b) explain the possible consequences of connecting an incorrect shore supply. (7)
10. Describe the construction of a three phase induction motor of the caged rotor type. (10)