

CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

**EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF
MARITIME AND COASTGUARD AGENCY

SMALL VESSEL SECOND ENGINEER**

060-01 - MARINE DIESEL ENGINEERING

FRIDAY, 19 August 2022

1400-1600 hrs

Examination paper inserts:

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

MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. (a) Explain why air coolers are fitted after main engine turbo chargers. (6)
(b) Explain the effects of undercooling the charge air on the engine. (4)
2. (a) State FIVE defects that may be found when carrying out an overhaul of a medium speed diesel engine cylinder head. (5)
(b) State FIVE reasons why a diesel engine cylinder head may crack during service. (5)
3. Describe the principle of operation of a simple hydraulic governor. (10)
4. List TEN safety devices that may be fitted to a propulsion engine and gearbox arrangement, stating a reason why EACH device is fitted. (10)
5. Diesel bunkered within the European Community is permitted to contain up to 7% Biodiesel. List FIVE positive and FIVE negative effects this may have on the vessel operation. (10)
6. With reference to plate type heat exchangers:
 - (a) sketch the assembly, labelling the main components and indicating the direction of flow; (5)
 - (b) state the materials used for the plates and seals; (2)
 - (c) state the purpose of the plates being corrugated; (2)
 - (d) state the purpose of *tell tales*. (1)
7. Describe all the checks that should be made to ascertain the reasons why an engine with an electric starter motor is failing to start. (10)

8. With reference to the removal of a bottom end bearing of a large medium speed diesel engine:
- (a) describe the safety precautions necessary before commencement; (4)
 - (b) describe the removal procedure. (6)
9. Describe, with the aid of a sketch, the operation of a diesel engine propulsion system fluid coupling. (10)
10. (a) Sketch a block diagram of a lubricating oil system suitable for use with a reduction gearing, including all the protective devices. (5)
- (b) State the engineering purpose/function of EACH item in the system sketched in part (a). (5)