

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 January 2018

1400-1600 hrs

Examination paper inserts:

--

Notes for the guidance of candidates:

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

Materials to be supplied by examination centres:

--

MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. Explain the meaning of EACH of the following diesel engine terms:
 - (a) overlap; (2)
 - (b) scavenging; (2)
 - (c) afterburning; (2)
 - (d) compression; (2)
 - (e) expansion. (2)

2.
 - (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)

3.
 - (a) Show, using sketches, the THREE clearances necessary for efficient piston ring functioning. (3)
 - (b) Explain why piston rings are necessary. (2)
 - (c) Explain why the clearances sketched in part (a) are necessary. (5)

4.
 - (a) Sketch an overspeed trip of the centrifugal type. (6)
 - (b) Describe the operation of the overspeed trip sketched in part (a). (4)

5.
 - (a) Explain what is meant by EACH of the following fuel terms:
 - (i) cloud point; (2)
 - (ii) compatibility. (2)
 - (b) Describe how to avoid fuel system and engine related problems with reference to the TWO terms in part (a) (6)

6. Describe, with the aid of a sketch, a coalescer type distillate fuel oil filter. (10)

7. Describe how the lubricating oil of a large medium speed diesel engine may be assessed on board. (10)
8. With reference to the operation of an air starting system of a large medium speed marine diesel engine fitted with individual air starting valves:
- (a) state the checks to be carried out if the engine will not start when initiating the start sequence; (6)
 - (b) list FOUR safety devices fitted to the air start system. (4)
9. (a) Describe how to calibrate a diesel engine cylinder liner, already removed from the engine. (6)
- (b) State the precautions that should be taken during initial startup when putting a new liner into service. (4)
10. Describe, with the aid of a sketch, an epicyclic planetary reduction gear. (10)