

CERTIFICATE OF COMPETENCY EXAMINATION

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

SMALL VESSEL EOOW

060-01 - MARINE DIESEL ENGINEERING

FRIDAY, 19 April 2024

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. With reference to turbocharger air coolers:
 - (a) explain the purpose of EACH of the following:
 - (i) zinc anodes; (2)
 - (ii) tube fins; (2)
 - (iii) drain cock on air manifold. (2)
 - (b) explain the parameters that could be measured to ascertain cooler performance. (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 a procedure for manually testing the set points on diesel generator HT cooling water, high temperature alarm and shut down. (10)
4. With reference to diesel engine fuel injection pumps:
 - (a) sketch the position of the plunger at EACH of the following points:
 - (i) start of fuel delivery; (3)
 - (ii) end of fuel delivery; (3)
 - (b) explain how the timing of fuel delivery is adjusted. (4)
5.
 - (a) Explain what is meant by the term *flashpoint* of bunker fuel stored on board. (1)
 - (b) Describe the importance of knowing the flash point of the bunker fuel stored on board. (1)
 - (c) Describe a method in common use for ascertaining the flashpoint of bunker fuel. (4)
 - (d) State the SOLAS requirements, with respect to temperature, for storage of bunker fuel in an engine room. (4)

6. Describe the procedure for changing over and replacing a duplex type fuel oil filter fitted on the discharge side of a pump. (10)
7. (a) Describe the possible causes of heat exchanger performance reduction. (6)
- (b) Describe how the performance of heat exchangers may be determined. (4)
8. Describe the inspection of a diesel engine piston that has already been removed from the engine. (10)
9. With reference to pneumatic clutches used for medium speed main propulsion purposes:
- (a) describe the operating principle of the clutch; (5)
- (b) explain how this clutch may be engaged in the event of failure of the control system; (3)
- (c) state TWO interlocks necessary for clutch operation. (2)
10. With reference to main reduction gearing:
- (a) explain why lubricating oil should be supplied before the gearing rotates; (4)
- (b) state the condition monitoring techniques that may be employed to assess the condition of the gearing. (6)