

MARINE DIESEL ENGINEERING

Attempt ALL questions

Marks for each part question are shown in brackets

1. Explain the effects of EACH of the following:

(a) early ignition;

(4) 1

(b) late ignition;

(4) 1 ✓

(c) low compression.

(2) 1

2. Describe, with the aid of a sketch, a valve actuating mechanism for a 4-stroke engine from cam to valve, labelling the MAIN components and showing where the tappet clearance may be measured.

(10) ✓

3. (a) Outline the actions which must be taken, by the on-watch engineer when the engine crankcase oil mist detector activates.

(5) 3

(b) Sketch a crankcase explosion relief door, labelling the MAIN components.

(5) 5 43

4. With reference to scroll type fuel injection pumps:

(a) describe how the delivered quantity of fuel may be varied;

(5) 3

(b) explain the purpose of the delivery valve;

(5) 3 ✓

(c) describe how fuel oil is prevented from spraying out if the high pressure pipe fails in service.

(2) 5 2

5. With reference to distillate fuel oil material safety datasheets, describe with examples the information that would be included for EACH of the following:

(a) hazards;

(4) 2

(b) first aid;

(3) 2

(c) fire fighting measures.

(3) 2

6. (a) Describe how contamination of fuel oil by EACH of the following can occur:
- (i) microbes; (2) 2
 - (ii) sodium chloride. (2) 1
- (b) Describe how to avoid fuel system and engine related problems with reference to the TWO contaminants in part (a). (6) 5
7. (a) Describe, with the aid of a sketch, the construction of a plate type heat exchanger. (7) 6
- (b) State THREE advantages of the plate types, compared with the tube type heat exchanger. (3) 2
8. (a) Sketch an electric starting motor system, labelling the MAIN components. (5) 4
- (b) With reference to the starting system batteries in part (a):
- (i) describe the maintenance checks required to prolong the batteries life; (3) 2
 - (ii) describe any safety procedures necessary when handling batteries. (2) 1 ✓
9. (a) State the safety precautions necessary before removing a four stroke diesel engine cylinder head. (4) 4
- 4r (b) Explain the procedure for removing a four stroke diesel engine cylinder head. (6) 2
10. (a) State how gearbox oil may become contaminated with water. (1) 1
- (b) Explain the effects of water contamination of gearbox oil. (5) 4 ✓
- (c) Describe the actions to be taken should a gearbox become contaminated with water. (4) 3