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10MR53

**Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015**  
**Marine Internal Combustion Engine – I**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. Draw the indicator diagram (P-V diagram) and valve timing diagram of a four-stroke marine diesel engine. (08 Marks)
- b. Compare between slow speed, medium speed and high speed diesel engines used on board. (04 Marks)
- c. Write short notes on :
  - i) Mean Piston Speed
  - ii) Maximum Continuous Rating
  - iii) Self ignition temperature. (08 Marks)
- 2 a. Write short notes on :
  - i) Piston
  - ii) Connecting rod
  - iii) Bed plate
  - iv) Liner (08 Marks)
- b. Explain with a neat diagram the working of a hydraulically operated exhaust valve used in a two-stroke marine diesel engine. (08 Marks)
- c. What is the main purpose of tie rods in a two-stroke marine diesel engine? Why there are no tie rods in a four-stroke marine auxiliary diesel engine? (04 Marks)
- 3 a. Define supercharging. What are the arrangements provided in a marine diesel engine for it? (06 Marks)
- b. Define scavenging. Explain various types of scavenging with neat sketches. (10 Marks)
- c. Where is the location of charge air cooler? What is the main purpose of cooling the charge air? (04 Marks)
- 4 a. With simple diagrams, explain pulse type and constant pressure type turbocharging. (08 Marks)
- b. Draw a neat labeled diagram of a single stage axial flow type turbocharger. (08 Marks)
- c. What are the merits and demerits of constant pressure type turbocharger? (04 Marks)

**PART – B**

- 5 a. Explain how fuel preparation is done on board for efficient combustion in a marine diesel engine. (06 Marks)
- b. Explain the construction and working of a needle valve type fuel injector with a neat labeled diagram. (10 Marks)
- c. Write short notes on :
  - i) Ignition delay
  - ii) After burning. (04 Marks)

- 6 a. Draw a neat labeled diagram of an oil cooled piston used in an auxiliary engine. Write down the merits and demerits of oil cooled and water cooled piston. (10 Marks)
- b. Briefly describe the flow of jacket cooling water of main engine with a simple line diagram. (06 Marks)
- c. What are the tests carried out on cooling fresh water for a two-stroke marine diesel engine? (04 Marks)
- 7 a. Explain how crankcase explosion occur. What are the detection and safety fittings provided to prevent damage from it with simple sketches? (10 Marks)
- b. List the various indications of scavenge fire. (05 Marks)
- c. What are the actions to be taken in case of an uptake fire? (05 Marks)
- 8 a. Describe the developments and merits of long stroke diesel engine. (10 Marks)
- b. Write short notes on:
- i) Work hardening
  - ii) Flame hardening
  - iii) Nitriding
  - iv) Carburizing
  - v) Annealing
- (10 Marks)