BT-MRE-V-12.17-1738 Reg. No. | | | | | | | | |

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# *B.Tech. Degree V Semester Examination in Marine Engineering December 2017*

## MRE 1504 MARINE INTERNAL COMBUSTION ENGINES I

(*2013 Scheme*)

Time: 3 Hours Maximum Marks: 100

(5 × 20 = 100)

I. (a) Describe thermal efficiency of a diesel engine and prepare a heat balance diagram. What is the significance of a heat balance diagram and what are the different methods adopted onboard a ship for improving the thermal efficiency of a plant? (10)

(b) Make a comparison of two-stroke and four-stroke engines. (10)

**OR**

II. Sketch and describe a piston used in a large two-stroke crosshead type engine. How is piston cooling achieved? What are the piston cooling media used and state the relative merits and demerits. (20)

III. (a) What is supercharging? What are the advantages of a supercharged engine? (5)

(b) Describe various scavenging arrangements used in two-stroke diesel engines and state the merits and demerits of each. (15)

**OR**

IV. With the help of a neat sketch explain the constructional details of a turbocharger used in marine diesel engines. (20)

V. Draw a typical fuel oil treatment system and a fuel oil service system for main propulsion engine on board a ship. Explain the systems indicating approximate values of relevant parameters at each stage. (20)

**OR**

VI. Sketch and describe a fuel injector used on a medium speed marine diesel engine. Briefly explain the terms atomization, penetration and afterburning. (20)

VII. What are the main causes of a starting air line explosion? What are the safe practices to be adopted to avoid such an explosion? What are the safety devices fitted on an engine to prevent starting air line explosion? (20)

**OR**

VIII. How does a crankcase explosion occur? What are the safety devices fitted on marine diesel engines to safeguard against crankcase explosion? (20)

IX. Sketch and describe a helical groove type fuel pump with provisions for varying the injection timing and the quantity of fuel injected. Explain the term VIT. (20)

**OR**

X. Sketch and describe a camshaft-less marine diesel engine with common rail system for fuel supply and exhaust valve actuation. Justify the statement "with electronic fuel injection, the control of engine functions are limited only by the designer's imagination and the laws of nature". (20)

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