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***B.Tech. Degree V Semester Examination in Marine Engineering
December 2014***

MRE 504 MARINE INTERNAL COMBUSTION ENGINES - I

Time : 3 Hours

Maximum Marks : 100

(5 x 20 = 100)

- I. (a) Differentiate between 2-stroke and 4-stroke marine diesel engines. Explain the working of these engines with the help of P-V diagrams. (10)
- (b) Draw and explain the valve timing diagrams of 2-stroke and 4-stroke marine diesel engines. Explain what is overlap in a 4-stroke engine timing. (10)

OR

- II. (a) What are the different methods of scavenging in 2-stroke marine diesel engines and compare their efficiencies. (10)
- (b) Explain the following terms (i) Naturally aspirated engines and Turbo charged engines (ii) Heat balance and thermal efficiency (iii) Slow speed, medium speed and high speed engines. (10)
- III. (a) Sketch and describe a uniflow scavenged 2-stroke diesel engine cylinder head showing the exhaust valve, combustion chamber and cooling water arrangements. (10)
- (b) Sketch and describe an oil cooled piston of a 2-stroke diesel engine showing the cooling arrangements, piston crown, piston skirt, piston rod etc. (10)

OR

- IV. (a) Sketch and describe a cylinder liner of a 2-stroke engine and explain what is bore cooling. (10)
- (b) Sketch and describe bed plate, A frame, cylinder block and tie rod. (10)
- V. Sketch and describe the working of a helical controlled bosch type diesel engine fuel pump and explain in detail how the fuel quantity is varied according to the engine load. (20)

OR

- VI. Sketch and describe the working of a diesel engine fuel injector and explain in detail how the injector valve opens and closes during fuel admission to the engine. (20)

(P.T.O.)

- VII. Sketch and describe a constant pressure turbo charging system showing the engine cylinder, exhaust manifold, turbine, compressor, charge air cooler and booster blower. Explain the working of the electrically driven booster blower during starting and manoeuvring. (20)

OR

- VIII. Sketch the sectional view of a water cooled exhaust gas turbo charger and explain in detail its working. Why labyrinth glands are fitted in turbo chargers instead of ordinary glands. (20)

- IX. (a) What is Nox and Sox emissions in the exhaust of a marine diesel engine and their effects in the atmospheric pollution. (10)
(b) How is the Nox and Sox emissions are controlled? (10)

OR

- X. Write short notes on *any four* of the following:

- (i) Common rail fuel injection system (4 x 5 = 20)
- (ii) Crankcase explosions
- (iii) Crank case oil mist detector
- (iv) Scavenge fires
- (v) Ignition delay and after burning
- (vi) Engine vibrations and critical speed.
