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***B.Tech. Degree VIII Semester Supplementary Examination in
Marine Engineering June 2024***

**MRE 1803 MARINE MACHINERY SYSTEM DESIGN
(2013 Scheme)**

Time: 3 Hours

Maximum Marks: 100

(Answer *ALL* questions)

(5 × 20 = 100)

- I. (a) What are the considerations while designing engineering systems? (10)
(b) What is meant by tolerance and how it is expressed in engineering drawings? Explain with sketches. (10)
- OR**
- II. (a) Explain casting and forging. Compare its advantages and disadvantages. (10)
(b) Explain how different types of fits help in assembly of equipment. (10)
- III. (a) What are the design requirements for the piston of a 4- stroke diesel engine? Compare the advantages and disadvantages of cast iron and aluminium alloy pistons for 4-stroke engines. (10)
(b) What are the stresses acting on the connecting rod of a 4-stroke diesel engine? What cross-section is preferred for the connecting rod and why? (10)
- OR**
- IV. (a) What is a journal bearing? Where are they used on board in a modern ship? Explain hydrodynamic lubrication with regard to a journal bearing. (10)
(b) Explain the working of an improved high lift spring loaded safety valve with a simple sketch. What are Class regulations that govern the design of a safety valve? (10)
- V. Describe the design process of the propeller shaft and intermediate shaft of slow speed marine propulsion system. (20)
- OR**
- VI. (a) Draw a jacket cooling water system of a marine 2-stroke engine. Explain what factors are to be taken into account while designing such a system. (15)
(b) What type of heat exchanger is used in the central cooling water system of a modern ship and why? (5)
- VII. Explain in detail the requirements of an electro hydraulic steering system used onboard oil tankers of one lakh tonnes dead weight and above. (20)
- OR**
- VIII. Sketch and describe the lubrication oil system of a 2-stroke marine diesel engine and explain how the system is designed to meet its operational requirements. (20)

(P.T.O.)

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- IX. (a) What are the factors to be considered while designing the firefighting system of a crude oil tanker? (10)
- (b) What are the factors to be considered while designing the exhaust gas system of a two-stroke marine engine? (10)
- OR**
- X. Write short notes on:
- (a) Steam turbine condenser (6)
- (b) IMO regulations for bulk CO₂ ER firefighting system of a cargo ship (6)
- (c) Fuel injectors for HO use in 2 stroke marine diesel engines (4)
- (d) Ship's domestic refrigeration plant cooling load. (4)
