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

**19-208-0804 MARINE MACHINERY SYSTEM DESIGN (ELECTIVE I)
(2019 Scheme)**

Time: 3 Hours

Maximum Marks: 60

Course Outcome

On successful completion of the course, the students will be able to:

- CO1: Understand design considerations of marine systems.
 CO2: Gain knowledge regarding marine machinery component design.
 CO3: Explain the design of power transmission systems and the cooling systems.
 CO4: Understand the designing of Lub Oil system, Steering gear system and Air starting system.
 CO5: Gain knowledge on design of fuel systems, steam and gas turbine plants, davits and firefighting systems.

Bloom's Taxonomy Levels (BL): L1 – Remember, L2 – Understand, L3 – Apply, L4 – Analyze, L5 – Evaluate,
 L6 – Create

PI – Programme Indicators

(Answer *ALL* questions)

(5 × 15 = 75)

		Marks	BL	CO	PI
I.	(a) Which are the main non-metals used in manufacture of machinery parts in the engineering industry? What are the qualities that make them suitable for their intended use?	8	L3	1	1.4.1
	(b) When is forging preferred as a method of manufacture for marine engine components? Name some parts that can be made by forging in a diesel engine.	7	L3	1	1.3.1
OR					
II.	(a) Make a brief comparative study of the various process available for the manufacture of machinery components	10	L3	1	1.3.1
	(b) What is surface finish, why is it important for the crosshead pin of a marine two stroke diesel engine	5	L3	1	3.1.6
III.	(a) The crankshaft of a two stroke engine is subjected to various stresses while in operation. How are they taken care of during its design?	10	L3	2	3.3.1
	(b) How does the piston of a two stroke engine differ from that of a four stroke engine? Explain the reason for these differences.	5	L4	2	1.3.1
OR					
IV.	(a) What are the forces acting on the different parts of a four-stroke engine connecting rod? What is the criteria for calculating the cross section area of the connecting rod?	10	L3	2	3.2.1
	(b) What type of spring is used in the assembly of the inlet/exhaust valves of a four stroke engine and why?	5	L3	2	3.1.6

(P.T.O.)

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		Marks	BL	CO	PI
V.	(a) Sketch and describe the propeller shafting system of a ship having a fixed propeller. What major change is required in the shafting of the vessel if it is using a CP propeller?	10	L2	3	3.1.6
	(b) What is the function of a thrust block on a ship? Explain briefly its construction and lubrication.	5	L2	3	1.3.1
OR					
VI.	(a) Sketch and describe the cooling water system of a modern ship. What factors are considered while designing the capacity of the system?	10	L3	3	3.2.3
	(b) What are the advantages and disadvantages of the central cooling water system used on ships?	5	L4	3	1.3.1
VII.	(a) Sketch and describe the lubricating oil system of a four stroke diesel engine. What equipment is provided during design to keep the lubricating oil clean?	10	L2	4	1.4.1
	(b) What factors are to be considered while designing the safety valve of an air compressor?	5	L3	4	3.1.6
OR					
VIII.	(a) Describe the steering gear found on large tanker ship, what are the statutory requirements for steering gears.	10	L2	4	1.4.1
	(b) What factors are to be considered in the selection of the motor of a Lub oil purifier?	5	L4	4	3.1.6
IX.	(a) Describe the exhaust gas system of a marine two stroke main engine. What factors to be considered in the design of exhaust gas boiler?	10	L3	5	3.2.1
	(b) What are statutory requirements to be met while designing the launch mechanism for the life boat of a cargo ship?	5	L3	5	3.1.4
OR					
X.	Write short notes on:				
	(i) Finite element analysis	5	L3	5	5.1.1
	(ii) Bulk CO2 system	5	L3	5	1.3.1
	(iii) Design of ship's Refrigeration plant.	5	L3	5	3.1.6

Blooms's Taxonomy Level
L2 – 23%, L3 – 67%, L4 – 10%.
