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B.Tech. Degree V Semester Regular/Supplementary Examination in Marine Engineering November 2023

19-208-0505 MARINE INTERNAL COMBUSTION ENGINES - 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 the basics of IC engines and on the IC engine components in details.
 CO2: Explain regarding the scavenging and supercharging in marine diesel engines.
 CO3: Make a detailed study of combustion characteristics in IC engines and control of exhaust emissions.
 CO4: Understand the cooling methods employed in IC engines and to analyze the safety and prevention of incidents like crankcase explosion, scavenge fires, uptake fires and starting air line explosion.
 CO5: Gain knowledge on balancing of engine and on the effects of vibration. To have a good understanding about the fuel injection system of a marine diesel engine.

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) Explain Bedplate, holding down bolts and chocks with neat diagram.	10	L1	1	1.4.1
	(b) Explain valve timing diagram of four stroke engine with significance of each point.	5	L2	1	1.3.1
OR					
II.	(a) Explain a frame and tie rod in a large two stroke marine engine with neat sketches.	10	L1	1	1.3.1
	(b) Explain a cross head in a two stroke marine diesel engine with neat sketch.	5	L2	1	1.3.1
III.	(a) Explain the parts of turbocharger with neat sketch.	10	L2	1	1.3.1
	(b) Explain loop scavenging with a sketch, its advantages and disadvantages.	5	L1	1	1.3.1
OR					
IV.	(a) Explain different types of scavenging with merits and demerits.	10	L1	2	1.3.1
	(b) Explain a constant pressure turbocharger and why is it used in large two stroke engines.	5	L2	2	1.3.1
V.	(a) Explain in detail various control measures for SO _x and NO _x in engine emissions.	10	L1	3	1.4.1
	(b) Explain the importance of atomisation and penetration of fuel in combustion chamber.	5	L2	3	1.4.1
OR					
VI.	(a) Explain the FO service system used on board on a large marine diesel engine with a line diagram.	10	L1	3	1.4.1
	(b) Explain five faults in a fuel injector.	5	L2	3	1.4.1

(P.T.O.)

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		Marks	BL	CO	PI
VII.	(a) Explain crankcase explosion.	8	L1	4	1.4.1
	(b) Explain prevention measures and safety mechanisms provided to prevent crankcase explosion.	7	L2	3	1.4.1
OR					
VIII.	Explain:				
	(a) Bore cooling of a cylinder liner with neat sketch.	8	L2	4	1.3.1
	(b) Explain the advantages of a long stroke marine diesel engine.	7	L2	4	1.3.1
IX.	(a) Explain common rail fuel injection system employed in RT flex engines.	10	L2	5	1.3.1
	(b) Explain the working principle of Viscotherm.	5	L2	5	1.3.1
OR					
X.	(a) Explain spill type fuel pumps used in Sulzer engines.	10	L2	5	1.3.1
	(b) Explain VIT and FQS in large two stroke marine engines.	5	L2	5	1.3.1

Bloom's Taxonomy Levels
L1 - 46.67%, L2 - 53.33%.
