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***B.Tech. Degree V Semester Regular/Supplementary Examination in  
Marine Engineering November 2022***

**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 detail.  
 CO2: Explain regarding scavenging and supercharging in Marine Diesel Engines.  
 CO3: Make a detailed study of combustion characteristics in I.C. Engines and control of exhaust emission.  
 CO4: Understand the cooling methods employed in I.C. 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

**PO – Programme Outcome**

		(5 × 15 = 75)	Marks	BL	CO	PO
I.	(a) Explain MCR, CSR, Mean piston speed and thermal efficiency.		8	L2	1	1.4.1
	(b) Explain constructional features of a marine diesel engine liner with diagram.		7	L2	1	1.4.1
<b>OR</b>						
II.	(a) Explain the heat balance diagram of a marine diesel engine with diagram.		8	L2	1	1.4.1
	(b) What is a Tie rod? How tie rods are tightened. What are the consequences of loose and broken tie rods?		7	L3	1	1.4.1
III.	(a) Explain with figures loop scavenging, cross scavenging and uniflow scavenging. Explain the merits and demerits of each type.		9	L2	2	1.4.1
	(b) Explain the requirements and advantage of an air cooler in the scavenge air system.		6	L2	2	1.4.1
<b>OR</b>						
IV.	(a) Explain: (i) Constant pressure turbo charging (ii) Pulse type turbo charging.		9	L1	2	1.4.1
	(b) Explain surging of turbocharger.		6	L3	2	1.4.1
V.	Explain different phases of combustion with the help of pressure–crank angle diagram.		15	L2	3	1.4.1
<b>OR</b>						
VI.	(a) Draw a neat sketch of a fuel injection valve and explain its parts.		8	L3	3	1.4.1
	(b) What are the possible faults in a fuel injector?		7	L2	3	1.4.1

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		Marks	BL	CO	PO
VII.	(a) What is starting air line explosion? Explain the immediate actions with remedial measures.	9	L2	4	1.4.1
	(b) What are the advantages and disadvantages of using oil and water for piston cooling?	6	L1	4	1.4.1
<b>OR</b>					
VIII.	(a) Explain two different types of Oil mist detector with diagrams.	9	L1	4	1.4.1
	(b) What is an Uptake fire? How can we avoid an uptake fire?	6	L2	4	1.4.1
IX.	(a) How is VIT actuated in B and W and Sulzer engine fuel pumps?	10	L3	5	1.4.1
	(b) What is axial vibration with respect to marine diesel engine?	5	L3	5	1.4.1
<b>OR</b>					
X.	What is VIT? Explain the relation of VIT rack, Fuel index and peak pressure with respect to load.	15	L3	5	1.4.1

Bloom's Taxonomy Levels

L1 – 16%, L2 – 50%, L3 – 34%.

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