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

19-208-0502 MARINE BOILERS AND STEAM ENGINEERING (2019 Scheme)

Time: 3 Hours

Maximum Marks: 60

Course Outcome

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

- CO1: Understand basics of boiler design and the different types of smoke tube and fire tube marine boilers.
 CO2: Gain knowledge about waste heat boilers and boiler mountings and accessories.
 CO3: Understand operation and maintenance of boilers and refractories and burners used in boilers.
 CO4: Explain the working of steam engines and steam turbines and their lay out, selection of materials and constructional details.
 CO5: Understand the working of condensers and the operation and alignment of steam turbines.
 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) Describe the various destructive and non-destructive tests carried out on plates and welding seams for the construction of boilers.	8	L2	1	1.3.1
	(b) Compare and list the various differences between smoke tube and water tube boilers.	7	L2	1	1.4.1
OR					
II.	(a) Sketch and explain a simple vertical Cochran boiler.	10	L2	1	1.4.1
	(b) What are the different types of boilers used for Marine Purposes?	5	L1	1	1.4.1
III.	(a) Sketch and explain a Double Evaporator Boiler.	10	L1	2	1.4.1
	(b) Write short notes on superheater and desuperheaters.	5	L3	2	1.4.1
OR					
IV.	(a) Sketch and explain Full Bore Safety Valve used in boilers. What are its advantages?	10	L2	2	1.4.1
	(b) Write short notes on Gauge glass of a boiler.	5	L2	2	1.4.1
V.	(a) Explain the preparation and procedure for hydraulic test of a boiler.	10	L1	3	1.4.1
	(b) Write down the procedure for the blowing down of a boiler. What is the purpose of blow down of a boiler?	5	L2	3	1.4.1
OR					
VI.	(a) What are the purposes of a refractory in a boiler? What are the types of refractory used in a boiler?	10	L1	3	1.4.1
	(b) Write down the list of alarms and trips of a Marine Auxiliary Boiler?	5	L3	3	1.4.1

(P.T.O.)

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		Marks	BL	CO	PI
VII.	(a) What are the advantages of steam turbine over steam engines?	5	L1	4	1.4.1
	(b) Explain the various types of blades used in a steam turbine and their method of fixing on steam turbines.	10	L3	4	1.4.1
OR					
VIII.	(a) What are the materials used in the following components of a turbine? Justify. (i) Blades (ii) Rotors (iii) Casings.	10	L1	4	1.4.1
	(b) Write a short note on labyrinth seal in steam turbine.	5	L3	4	1.4.1
IX.	(a) Draw the condensate line of a steam condenser and explain how the water level is maintained?	10	L1	5	1.4.1
	(b) Write a short note on surface condenser.	5	L1	5	1.4.1
OR					
X.	(a) Explain the main objects of warming up a steam turbine and write in detail the procedure for warming up.	10	L2	5	1.4.1
	(b) Write a short note on vibration of steam turbines.	5	L3	5	1.4.1

Bloom's Taxonomy Levels

L1 = 43.3%, L2 = 36.7%, L3 = 20%.
