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***B.Tech. Degree V Semester Special Supplementary Examination in
Marine Engineering June 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: General Considerations governing the design of Boilers, Smoke tube and water tube boilers

CO2: Waste heat boilers, Boiler Mountings and Accessories

CO3: Operation, Care and Maintenance, Refractory, Fuel burning

CO4: Steam Engineering and Turbines, Lay out of plant, Selection of Materials, constructional details

CO5: Condensers, Operation and Maintenance

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 in brief the various destructive and non-destructive tests carried out on plates and rivets used for boiler construction.	10	L4	1	2
	(b) Sketch and describe a Foster Wheeler ESD-II type boiler used on board ships.	5	L2	1	3
OR					
II.	(a) Sketch and describe any one type of Smoke tube boiler.	10	L2	1	3
	(b) What are the classification society requirements for the construction of boiler onboard a ship?	5	L5	1	1
III.	(a) Explain Cochran Single pass Composite boiler with a neat sketch.	10	L2	2	3
	(b) Write short notes on:	5	L2	2	2
	(i) Tubular type Gauge Glass.				
	(ii) Main Steam Stop Valve.				
OR					
IV.	(a) Sketch and describe an improved high lift safety valve. State the advantages of using the same.	7	L4	2	3
	(b) What are boiler mountings? Explain briefly about any four external boiler mountings and its function.	8	L2	2	2
V.	(a) Describe with a sketch, the process by which a residual fuel is burnt in a boiler furnace.	10	L3	3	3
	(b) Describe the different types of refractory used in a boiler and why they are used?	5	L4	3	2
OR					
VI.	(a) Explain the different methods used for laying up of a water tube boiler.	10	L5	3	4
	(b) What is meant by blow down and scumming of a boiler?	5	L2	3	7

(P.T.O.)

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		Marks	BL	CO	PI
VII.	(a) What are the materials used for making the various components like blades, rotors, casings, sealing glands, gears of a steam turbine and explain their justification?	7	L2	4	3
	(b) Write briefly on:	8	L4	4	3
	(i) Types of blades used and method of fixing them for impulse and steam turbines.				
	(ii) Labyrinth packing glands.				
OR					
VIII.	(a) Draw a neat sketch of a Steam Turbine Rotor and describe its parts.	8	L1	4	3
	(b) What is the function of a labyrinth gland in a steam turbine? Describe its parts with the help of a sketch.	7	L2	4	3
IX.	(a) Sketch and describe a regenerative type condenser and explain its advantages.	10	L2	5	3
	(b) Explain the procedure to put the turbine plant for warming up.	5	L3	5	4
OR					
X.	(a) Describe the various types of condensers used in a steam plant. How the leakages are detected and what are the causes of loss of vacuum?	10	L4	5	4
	(b) Write notes on:	5	L3	5	3
	(i) Turbine vibration				
	(ii) Turbine rotor balancing.				

Bloom's Taxonomy Levels

L1 = 5.4%, L2 = 44.6%, L3 = 13.3%, L4 = 26.7%, L5 = 10%.
