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

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

Maximum Marks: 60

Time: 3 Hours

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
 PO – Programme Outcome

		(5 × 15 = 75)	Marks	BL	CO	PO
I.	(a) Describe the types of smoke tube fitted in a Scotch boiler and state how smoke tubes are attached to the tube plate.		9	L3	1	2
	(b) Explain the reason for working pressure limitation in fire tube boilers.		6	L5	1	3
OR						
II.	(a) Write notes on the following tests given below applicable on Boiler Plates, welds and rivets.		10	L2	1	5
	(i) Tensile test					
	(ii) Bend Test					
	(iii) Dye Penetrant test					
	(iv) Magnetic Particle test.					
	(b) Sketch a manhole door and explain why it is placed on the shell in a certain way?		5	L3	1	3
III.	(a) Sketch and describe a Cochran Composite Boiler suitable for producing low pressure steam for auxiliaries.		10	L2	2	3
	(b) What is Ogee ring? What are the factors considered for reducing damage to Ogee ring during design and while boiler is in use?		5	L3	2	4
OR						
IV.	(a) Sketch and describe a double evaporation boiler.		6	L2	2	4
	(b) What are boiler mountings? Explain briefly about.		9	L2	2	2
	(i) Boiler gauge glass.					
	(ii) Air vent.					
	(iii) Safety Valve.					
V.	(a) Explain the steam raising procedure for a water tube boiler from cold condition.		8	L2	3	2
	(b) Describe with a line diagram, step by step procedure of blowing down a boiler in operation. What are the points to be considered before starting blow down?		7	L1	3	7

OR

(P.T.O.)

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		Marks	BL	CO	PO
VI.	(a) Write notes on the following:	8	L4	3	4
	(i) Boiler refractory.				
	(ii) Types of fuel atomizer used in marine boiler and draw a pressure jet burner tip and explain its working.				
	(b) Describe the procedure for carrying out a hydraulic test of water tube boiler.	7	L1	3	3
VII.	(a) What are the materials used for making various components like casings, rotors, blades, nozzles, and sealing glands of a steam turbine? Explain why it is used?	7	L5	4	2
	(b) Write briefly on:	8	L4	4	3
	(i) Advantages of steam turbine over steam engine.				
	(ii) Labyrinth glands in steam turbine.				
OR					
VIII.	(a) Write notes on :	10	L4	4	3
	(i) Vibration in marine steam turbines.				
	(ii) Different type of turbine blade fastening on rotors.				
	(b) What is compounding in turbines? Explain Velocity compounding in a steam turbine.	5	L4	4	4
IX.	(a) Explain the different expansion arrangements used in the construction of steam turbine condenser.	7	L3	5	3
	(b) What are the causes of loss of vacuum in a condenser? What are the methods to locate leak in surface condenser tubes?	8	L3	5	4
OR					
X.	(a) Draw condensate line of a steam condenser and explain how the water level is maintained?	7	L4	5	2
	(b) Sketch and describe the lubricating oil system of a steam turbine and gear box.	8	L2	5	3

Bloom's Taxonomy Levels

L1-9%, L2-34%, L3-23%, L4-25%, L5-9%
