Code No: P18MET09 R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
THERMAL AND HYDRAULIC PRIME MOVERS
(EEE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	What is the compression ratio	[2M]	1	
	b)	Write about steam turbine and state its fields of applications.	[2M]	2	
	c)	List out the methods to improve the efficiency of Open cycle gas turbine plant.	[2M]	3	
	d)	Explain the working principle of Kaplan turbine	[2M]	4	
	e)	Explain load duration curve	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.		Derive an expression for thermal efficiency of a Otto cycle with the help of P-V and T-S diagrams.	[10M]	1	
		OR			
3.	a)	Discuss the difference between theoretical and actual valve timing diagrams of a diesel engine.	[5M]	1	
	b)	Discuss with the help of suitable sketch the dry pump lubrication.	[5M]	1	
		UNIT-II			
4.		Draw the Rankine cycle on T-s diagram using dry saturated steam and obtain an expression for the Rankine cycle efficiency.	[10M]	2	
		OR			
5.		Explain velocity compound impulse steam turbine showing pressure and velocity variations along the axis of the turbine.	[10M]	2	
		UNIT-III			
6.	a)	Describe the differences between closed cycle gas turbine and open cycle gas turbine.	[5M]	3	
	b)	Explain the working of a gas turbine plant with inter cooler, reheating and regenerative systems.	[5M]	3	
		OR			
7.	a)	Derive an expression for force and work done per second by the jet when it strikes on the stationary curved vane when jet striking at the Centre.	[5M]	3	
	b)	A jet of water of diameter 5 cm moving with a velocity of 40 m/s strikes a curved fixed symmetrical plate at the center. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.	[5M]	3	
		UNIT-IV			
8.	a)	Explain the working of reciprocating pump with neat sketch.	[5M]	4	

	b)	Define the following: i) Manometric efficiency ii) Volumetric efficiency iii) mechanical	[5M]	4	
		OR			
9.	a)	Explain the working of a Pelton wheel with neat sketches?	[5M]	4	
	b)	Explain the performance characteristic curves of a hydraulic turbine.	[5M]	4	
		UNIT-V			
10.		Explain load factor, Utilization factor and capacity factor. Derive the relation between these factors.	[10M]	5	
		OR			
11.		What do you understand by hydroelectric power plant? What are its elements? Discuss them one by one with neat sketches.	[10M]	5	

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