SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations March-2023
THERMAL ENGINEERING
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	With the help of neat sketch explain the working principle of single stage Reciprocating air compressor.	CO1	L2	6M
	b	With the help of neat sketch explain the working principle of multi stage reciprocating air compressor with effect of intercooler.	CO1	L2	6M

OR

2	a	Derive an expression for minimum work required for two stage reciprocating air Compressor with perfect inter-cooling and neglect clearance volume.	CO1	L3	6M
	b	A single stage single acting air compressor has an effective swept volume of $5m^3$/min and delivers to a receiver pressure of 6.5 bar. The index of compression is 1.2, and the temperature at the end of suction stroke is 35°C and pressure is 1.03 bar. Calculate: (i) The mass of compressed air per minute (ii) The Temperature at the end of Compression. Take R=0.287 KJ/Kg K.	CO1	L4	6M

UNIT-II

3	Explain the working of Open Cycle Brayton cycle with neat sketch.	CO2	L2	12M

OR

4	Air enters the compressor of a gas turbine plant operating on Brayton cycle at 1bar, 27°C. The pressure ratio in the cycle is 6. Calculate the maximum temperature in the cycle and the cycle efficiency. Assume the turbine work as 2.5 times the compressor work. Take γ=1.4	CO2	L4	12M

UNIT-III

5	a	Define Steam nozzle and also explain about expansion of steam in nozzle with neat sketch.	CO3	L2	6M
	b	Explain various types of nozzles with neat sketches.	CO3	L2	6M

OR

6	How do you classify the condensers and describe about Surface condenser with a neat sketches.	CO3	L2	12M

UNIT-IV

7	Draw the combined velocity triangle of Parson's reaction turbine and explain the salient features.	CO4	L1	12M

OR

8	a	What are the various losses in steam turbines? Explain them Briefly.	CO4	L2	6M
	b	Explain Throttle Governing in steam turbines with neat sketch.	CO4	L2	6M

UNIT-V

9	a	Explain the Working Principle of 2-Stroke Engine.	CO5	L2	6M
	b	Briefly explain the Working Principle of 4-Stroke SI Engine.	CO5	L2	6M

OR

10	A test on a single cylinder 4 stroke Otto cycle engine yields the following data: 950Nm Torque, 7.6 bar mean effective pressure, 280mm bore, 305mm stroke, 300 rpm, 0.003Kg/s fuel consumption with heating value of 42000KJ/Kg. Determine: (i) Indicated thermal Efficiency (ii) Mechanical efficiency.	CO5	L3	12M

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Roll No.

BHARATH INSTITUTE OF ENGINEERING & TECHNOLOGY-PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations March 2021
THERMAL ENGINEERING
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1. a.	With the help of neat sketch explain the working principle of single stage reciprocating compressor.	CO1	L2	6M
b.	With the help of neat sketch explain the working principle of multi stage reciprocating compressor with inter cooler.	CO1	L2	6M

OR

2. a.	Derive an expression for minimum work required for two stage reciprocating air compressor with perfect inter-cooling and neglect clearance volume.	CO1	L3	6M
b.	A single stage single acting air compressor has an effective swept volume of 300 cm³ and takes in air at a pressure of 0.5 bar. The index of compression is 1.3 and the temperature at the end of suction stroke is 35°C and pressure is 0.5 bar. Calculate (i) The mass of compressor air per full stroke (ii) The Temperature at the end of compression. Take R = 0.287 kJ/kg K.	CO1	L3	6M

UNIT-II

3.	Explain the working of Brayton cycle with neat sketch.	CO2	L2	12M

OR

4.	An air standard compressor of a gas turbine plant operating on Brayton cycle at these conditions. The pressure ratio in the cycle is 6. Calculate the maximum temperature in the cycle and minimum temperature in the cycle... The maximum temperature in the cycle... Calculate T₂.	CO2	L4	12M

UNIT-III

5. a.	Define conversion and also explain... combustion in nozzle with neat sketch.	CO3	L2	6M
b.	Explain variation types of nozzles with neat sketch.	CO3	L2	6M

OR

6.	How air gas passes the condensers and describe about Surface condenser with a neat sketch.	CO3	L2	12M

UNIT-IV

7.	Derive the maximum velocity simple of Parsons Reaction turbine and explain the various features.	CO4	L3	12M

OR

8. a.	What is compounding Turbine in steam turbine? Explain different types.	CO4	L2	6M
b.	Explain the axial Expansion in steam turbine with neat sketch.	CO4	L2	6M

UNIT-V

9. a.	Explain the Working Principle of 2 Stroke Engine.	CO5	L2	6M
b.	Explain the Working Principle of 4 Stroke SI Engine.	CO5	L4	6M

OR

10. a.	A single cylinder 4 stroke Diesel engine works with the following data... gives developed 5 kW of brake power. The engine takes air... at bmep... with the temperature... and pressure. Find (i) Indicated Power (ii) Brake thermal efficiency. Take 42,000 kJ/kg. (iii) Indicated thermal efficiency. (iv) Mechanical efficiency. Take 42,000 kJ/kg.	CO5	L3	12M