Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Supplementary Examinations Feb-2021
THERMAL ENGINEERING
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1	a	Explain working principle of 4 stroke Diesel Engine with neat sketch.	6M
	b	Draw theoretical and actual port timing diagram of two stroke Petrol Engine with neat sketch?	6M

OR

2 A single cylinder and stroke cycle I.C. engine when tested, the following observations available: Area of indicator diagram = 3 sq.cm, Length of indicator diagram = 4 cm, Spring constant = 10 bar/cm, Speed of engine = 400 rpm, Brake drum diameter = 120 cm, Dead weight on brake = 380 N, Spring balance reading = 50 N, Fuel consumption = 2.8 kg/hr., Cv = 42000 kJ/kg, Cylinder diameter = 16 cm, Piston stroke = 20 cm. Find:
(i) F.P (ii) Mechanical efficiency (iii) BSFC and (iv) Brake thermal efficiency   **12M**

UNIT-II

3	a	Derive the relation for Volumetric efficiency of a single stage reciprocating compressor?	6M
	b	A single stage single acting air compressor has an effective swept volume of 5m3/min and delivers to a receiver pressure of 6.5 bar. The index of compression is1.25. Calculate work done?	6M

OR

4	a	With the help of neat sketch explain the working principle of multistage reciprocating air compressor with effect of intercooler?	7M
	b	A single stage reciprocating air compressor is required to compress 80 m³ of air from 1 bar abs to 10 bar abs. Find the work to be supplied if the law of expansion is $PV^{1.25}$=Constant?	5M

UNIT-III

5 In a single heater regenerative cycle, the steam enters turbine at 30 bar, 400° C and the exhaust pressure is 0.10 bar. The feed water heater operates at 5 bar. Calculate
(i) Efficiency and steam rate of cycle.
(ii) Also compare efficiency with cycle without regeneration. Pump work may be neglected   **12M**

OR

6	a	Explain the following a) dryness Fraction b) saturated water c) latent heat d) sensible heat?	8M
	b	State the advantages and disadvantages of a Reheat cycle?	4M

UNIT-IV

7 Dry saturated steam enters a frictionless adiabatic nozzle with negligible velocity at a temperature of 300° C. It is expanded to a pressure of 5000KPa.The mass flow rate is 1Kg/s. Calculate the exit velocity of steam?   **12M**

OR

8   Explain about super saturated flow in nozzles with neat sketch and represent in   12M
H-S diagram?

UNIT-V

9   In a single stage reaction turbine, both the fixed and moving blades have the same tip   12M
angles of 35° and 20° for inlet and outlet respectively. Determine the power required if the
isentropic heat drop in both fixed and moving rows is 23.5 kJ/kg. The mean blade speed is
80 m/s and the steam consumption is 22,500 kg/hr.

OR

10   What are the various losses in steam turbines? Explain them Briefly?   12M

*** END ***