R18 Regular Subject code: 2P5CB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Regular Examinations, February 2021

THERMAL ENGINEERING – I

(Mechanical Engineering)

Maximum Marks: 70 Date:19.02.2021 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10x2M=20 Marks)**

1 Define Air standard efficiency.
2 Compare SI and CI engines.
3 What is pre-ignition?
4 Mention the causes of diesel knock.
5 What is a positive displacement compressor?
6 What is brake power?
7 List the applications of compressors.
8 Define isentropic efficiency of an axial flow compressor.
9 Define COP.
10 Mention the types of air conditioning systems.

Part-B

Answer All the following questions. **(10M X 5=50Marks)**

11 Explain the working of a four stroke SI engine with neat diagrams. (10M)

OR

12 Describe the working principle of a conventional fuel injector in CI engine with a neat diagram. (10M)

13 Give an account of abnormal combustion in SI engines. (10M)

OR

14 Discuss the four stages of combustion in CI engines. (10M)

15 Describe the theory and experimental procedure to conduct a heat balance sheet on a single cylinder four stroke CI engine. (10M)

OR

16 Describe the working of a single stage reciprocating air compressor with a neat sketch and P-V diagram. (10M)

17 Explain the working of Roots blower and vane type rotary compressors with neat sketches. (10M)

OR

18 Describe the principle of operation of a centrifugal compressor with a sketch. (10M)

19 A vapour compression refrigerator works between the pressure limits of 60 bar and 25 bar. The working fluid is just dry at the end of compression and there is no under cooling of the liquid before the expansion valve. Determine (i) COP of the cycle (ii) capacity of the refrigerator, if the fluid flow is at the rate of 5 kg/min. (10M)

Pressure (bar)	Temperature (K)	Enthalpy (kJ/kg)		Entropy (kJ/kg K)	
		Liquid	Vapour	Liquid	Vapour
60	295	151.96	293.29	0.554	1.0332
25	261	56.32	322.58	0.226	1.2464

OR

20 Describe the working of summer air conditioning system with a neat sketch. (10M)