Regulation R18 *Subject code: 2P3CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, July 2024

THERMODYNAMICS

(Mechanical Engineering)

Maximum Marks: 70 Date:20.07.2024 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.

STEAM TABLES ARE ALLOWED

Part-A

All the following questions carry equal marks (10X2M=20 Marks)

Q.NO	QUESTIONS	Marks	CO	Blooms Tx
1	Define Zeroth law of Thermodynamics.	2	1	Remembering
2	Distinguish between different types of systems with examples.	2	1	Understanding
3	Write the available energy in a system?	2	2	understanding
4	State the property of entropy	2	2	Remembering
5	Define the equation of state.	2	3	Remembering
6	What is the process of Throttling.	2	3	Remembering
7	State the expression for Vander Wall's equation and determine the constants.	2	4	Remembering
8	Define Specific volume	2	4	understanding
9	State the Processes in Otto cycle and represent on P-V and T-S.	2	5	Application
10	Explain Mean effective pressure.	2	5	Evaluate

Part-B

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

11	Sketch the Constant volume gas thermometer and explain.	10	1	Analyze
	OR			
12	When a stationary mass of gas was compressed without friction at constant pressure, its initial state of 0.4m^3 and 0.105MPa was found to change to final state of 0.20m^3 and 0.105MPa. There was a transfer of 42.5kJ of heat from the gas during the process. Determine the change in internal energy of the gas?	10	1	Analyze
13	Write the Kelvin-Planck and Clausius statements and explain with sketches.	10	2	Understanding
	OR			

14	10 Kg of fluid per minute goes through reversible steady flow process. The properties of fluid at inlet are: P_1=15 bar, density = 26kg/m^3, velocity=110m/s Internal energy= 910kj/kg and at the exit are : P_2=5.5bar , density= 5.5kg/m^3, velocity = 190m/s internal energy = 710kj/kg. During passage the fluid rejects 55kj/sec and rises through 55meters Determine i) change in enthalpy ii) work done during the process.	10	2	Apply
15	Explain the phase transformation process with a diagram.	10	3	Apply
	OR			
16	When a stationary mass of gas was compressed without friction at constant pressure its initial state of 0.4$m^3$and 0.105 Mpa was found to change to final state of 0.20 m^3 and 0.105Mpa. There was a transfer of 42.5 kj of heat from the gas during process. How much did the internal energy of the gas change.	10	3	Analyze
17	Explain the working of Diesel cycle with PV and TS diagrams.	10	4	Apply
	OR			
18	Obtain an expression for the air standard efficiency on a volume basis of an engine working on the Otto cycle. And represent the processes on p-V and T-S diagrams.	10	4	Apply
19	Explain about the Clausius Inequality.	10	5	Understand
	OR			
20	Describe with PV and TS diagrams Stirling cycle.	10	5	Understand