R17 Regulation *Subject code:* 1P3CB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Year I Semester Supplementary Examinations, February 2020

Thermodynamics

(Mechanical Engineering)

Maximum Marks: 70 Date: 22.02.2021 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 thermodynamic system . what are types of systems.
2 What is point and path function.
3 What is thermal reservoir.
4 Define entropy.
5 Define dryness fraction.
6 What is universal gas constant.
7 Define pure substance .
8 Define mass fraction.
9 Sketch Otto cycle on P-V and T-S diagram.
10 Define air standard efficiency.

Part-B

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

11 (a) What are reversible and irreversible processes? Mention the cause of irreversibility.[5M]
(b) What are Principle of thermometry .[5M]

OR

12 (a) What are different scales of temperature? What is ideal gas scale.[5M]
(b) Explain different thermodynamic systems.[5M]

13 (a) Explain the principle of entropy increase.[5M]
(b) A cyclic heat engine operates between a source temperature of 1000^0C and a sink temperature of 40^0C. Find the least rate of heat rejection per kW net output of engine.[5M]

OR

14 (a) Derive Clausius inequality and state its significance.[5M]
(b) What are Maxwell relations.[5M]

15 (a) Draw T-S and H-S diagram for formation of steam.[5M]
(b) Difference between micro scopic and macro scopic.[5M]

OR

16 (a) Explain the triple point with neat sketch. [5M]
(b) State Clausius clapeyron equation.[5M]

17 (a) Explain Daltan's law of partial pressure.[5M]

(b) Percentage volumetric analysis of a sample of flue gases of a coal fired boiler gave CO_2=10.4 ,CO=0.2, O_2=7.8 and N_2=81.6 (by difference). Gravimetric percentage analysis of coal was C= 78,H_2=6,O_2=3 and incombustible =13 . estimate:

i) Weight of dry flue gases per kg of fuel.

ii) Weight of excess air per kg fuel. [5M]

OR

18 (a) Explain the construction of mollier chart and indicate all properties on it.[5M]

(b) What is super heated temperature.[5M]

19 (a) Compare Diesel and Dual cycle.[5M]

(b) Sketch P-V graph of Diesel and explain the process.[5M]

OR

20 (a) Explain the dual combustion cycle. [5M]

(b) Compare the Diesel and otto cycles with respect to compression ratio. [5M]