Roll No										

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester IV -2021
Course Code : MEC4003
Course Name : Sem IV - MEC4003 - Applied Thermodynamics
Program : MEC

Date : 18-APR-2023
Time : 9:30AM - 11AM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. In Otto cycle, heat addition takes place during constant_____process
(CO1) [Knowledge]

2. When maximum cycle pressure and output are same for Otto, Diesel and Dual Cycles, write the comparision of their efficiencies in the increasing order.
(CO1) [Knowledge]

3. Write any two assumptions made for air standard cycles.
(CO1) [Knowledge]

4. The thermal efficiency of simple gas turbine cycle depends on _____
(CO2) [Knowledge]

5. The gas in the cooling chamber of a closed cycle gas turbine is cooled at constant_____process
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 10 = 20M)**

6. Write the comparison between Otto, Diesel and Dual cycles with respect to thermal efficiency when
(i) Compression ratio and Heat addition are same
(ii) Maximum cycle pressure and heat input are same.
Draw the P-V and T-S diagrams for aboves cases.
(CO1) [Comprehension]

7. The closed cycle gas turbine is widely used in gas power plants for power generation. Derive the thermal efficiency for Closed cycle gas turbine along with P-V and T-S diagrams. Also Define Back-Work ratio.

(CO2) [Comprehension]

PART C

ANSWER ALL THE FOLLOWING QUESTIONS **(2 X 10 = 20M)**

8) An engine working on Otto cycle is supplied with air at 0.1 MPa, 35 C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate maximum temperature of the cycle, the cycle efficiencyand the mean effective pressure. (For air, Cp=1.005, Cv=0.718, and R=0.287 kJ/kg-K)

(CO1) [Application]

9) A gas turbine is supplied with gas at 5 bar and 1000 K and expands it adiabatically to 1 bar. Themean specific heat at constant pressure and constant volume are 1.0425 kJ/kg K and 0.7662 kJ/kg K respectively. (i) Draw the T-S and P-V diagrams to represent the processes of the simple gas turbine system. (ii) Calculate the power developed in kW per kg of gas per second (iii) Exhaust gas temperature.

(CO2) [Application]