Total No. of Questions : 4]

SEAT No. :

PA-439

[Total No. of Pages : 2

[5931]-75

S.E. (Automobile & Mechanical/Mechanical(Sandwich))

ENGINEERING THERMODYNAMICS

(2019 Pattern) (Semester - I) (202043)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***use of electronic pocket calculator is allowed.***
5) ***Assume suitable data; if necessary.***

Q1) a) Distinguish between : **[8]**

i) Intensive and Extensive properties.

ii) Process and cycles

iii) Open system and closed system

b) A closed vessel contains 2 kg of carbon dioxide at temperature 20ºC and pressure 0.7 bar. Heat is supplied to the vessel till the gas acquires a pressure of 1.4 bar. **[7]**

Calculate :

i) Final temperature

ii) Work done on or by the gas

iii) heat added

iv) Change in internal energy. Take specific heat of gas at constant volume as 0.657 kJ/kg-K.

OR

Q2) a) Prove that the ratio of specific heats at constant pressure to constant volume is equal to adiabatic index γ. **[7]**

b) With sketch write down the application of Steady Flow energy equation to : **[8]**

i) Nozzle ii) Boiler

iii) Turbine iv) Pump

P.T.O.

Q3) a) A domestic food freezer maintains a temperature of –15ºC. The ambient temperature is 30º C. If heat leaks into the freezer at continuous rate of 1.75 kJ/s. What is the least power necessary to pump this heat out continuously. **[5]**

b) Define specific heats at constant volume and at constant pressure. **[2]**

c) Draw P-V and T-S diagrams of : **[8]**

i) Constant volume

ii) Isothermal

iii) Adiabatic

iv) Constant Pressure

OR

Q4) a) State the limitation of first law of thermodynamics. **[2]**

b) Explain the concept of reversibility and irreversibility. **[6]**

c) Explain with neat diagram Carnot cycle write the efficiency of Carnot cycle. **[7]**

⌘⌘⌘