Exam.Code:0939
Sub. Code: 7041

1078
B.E. (Mechanical Engineering)
Third Semester
MEC-301: Applied Thermodynamics – I

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt <u>five</u> questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I.   Attempt the following:-

    a) Draw Carnot cycle on PV and TS diagrams.

    b) What is dryness fraction and how it is calculated?

    c) What is the effect of friction on nozzle efficiency?

    d) Draw ideal rankine cycle on P-V and T-S diagrams.

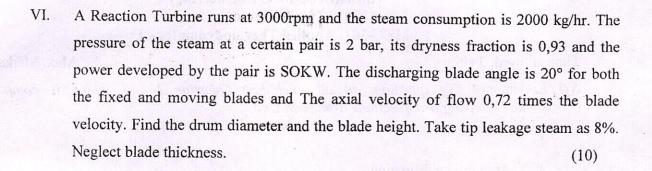   e) How gas power cycles differ from vapour power cycles?   (5x2)

UNIT – I

II.   A) Draw fusible plug and label the diagram explain the working.

    b) Explain the working of Babcok - Wilcox boiler with labelled diagram.   (3,7)

III. a) Draw and explain variation in Pressure and Velocity in Pressure-Velocity compounded impulse turbine.

    b) Steam is at 20bar, 300°C which is converted from water at 50°C. Find per kg of steam the heat added, change in entropy and work of evaporation using steam tables.   (3,7)

IV.   An industrial steam power plant is supplied with steam at 80bar, 350°C and steam is discharged at atmospheric pressure of 712.5mm of Hg. Calculate thermal efficiency and turbine work for a steam flow rate of 2kg/s.   (10)

UNIT – II

V.   Explain in detail the methods used in the governing of steam turbines (with the help of neat sketches).   (10)

P.T.O.

VI.   A Reaction Turbine runs at 3000rpm and the steam consumption is 2000 kg/hr. The pressure of the steam at a certain pair is 2 bar, its dryness fraction is 0,93 and the power developed by the pair is SOKW. The discharging blade angle is 20° for both the fixed and moving blades and The axial velocity of flow 0,72 times the blade velocity. Find the drum diameter and the blade height. Take tip leakage steam as 8%. Neglect blade thickness.   (10)

VII. Give the two statements of 2nd taw and prove that equivalence between two.
                                                                                                                         (10)

x-x-x