Code No: 113AB

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech: II Year I Semester Examinations, November/December-2016: THERMODYNAMICS

(Common to AE, AME, ME, MSNT)

Time: 3 Hours Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A (25 Marks)

Define control volume and control surface: :::1 -a) The pressure in a constant gas thermometer is measured as 32 mm of Hg above b) atmospheric pressure at triple point. Determine the temperature in ⁰C, when the pressure is 76 mm of Hg above atmospheric pressure. The barometer reads 752 mm Define and explain the flow work. [2] Calculate the percent error in C_{ν} that would result if C_{p} is assumed for liquid water at 1 atm and 27°C. [3] e) Define the pure substance. [2] Calculate specific enthalpy, specific volume and density of 1 kg of steam at a f) pressure of 1.9 MPa, having a dryness fraction 0.85. [3] What are mass fraction and mole faction?"::": [2] A volumetric analysis of a gaseous mixture gives the following results:

 $CO_2 = 12.0\%$ $O_2 = 4.0\%$ $N_2 = 82.0\%$ CO=2.0%

Determine the analysis of gas mixture on the mass basis, the molecular weight and gas constant on the mass basis for the mixture. Assume ideal gas behavior. [3]

Compare Otto, Diesel and Dual cycles for given compression ratio. [2] A refrigerator has a working temperature in the evaporation and condenser coils of -30°C and 30°C, respectively. What is the maximum possible COP of the refrigerator?

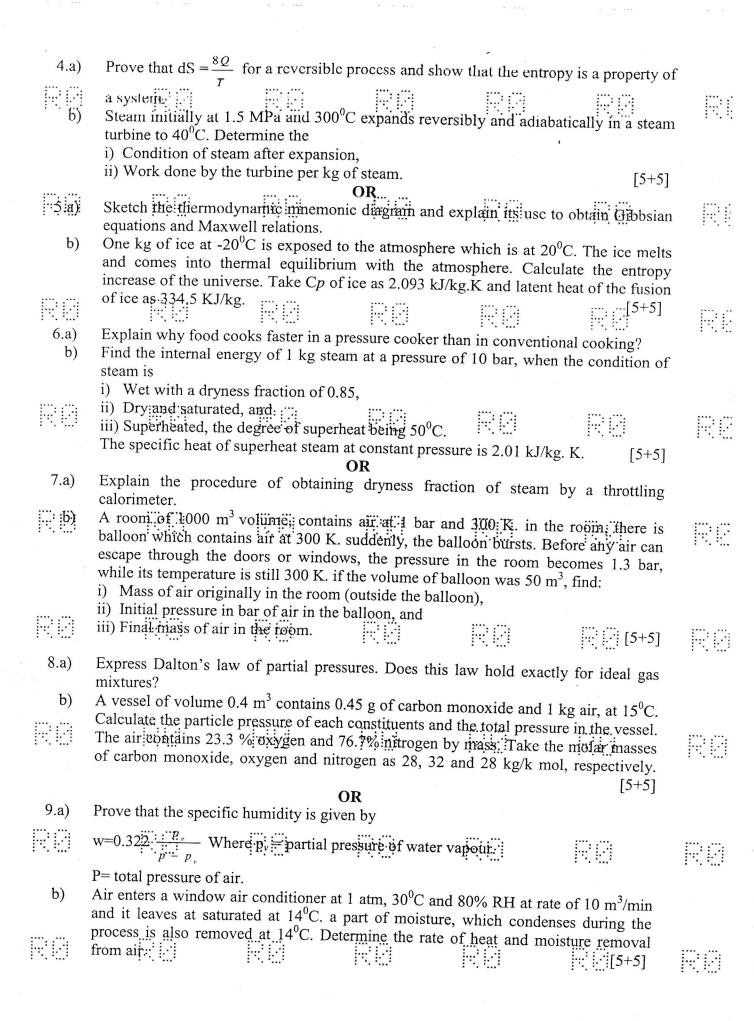
> PART - B (50 Marks)

Define thermodynamic property, state, path process and cycle.

The temperature scale of a certain thermometer is given by the t = A 1 n + B. where A b) and B are constants and P is the thermometric property of the fluid of the thermometer. At ice point and steam point, if the thermometer property is found to be 1.5 and 7.5 respectively, what will be temperature corresponding to the thermometric property of 3.5 on Celsius scale? :::[5+5]

Differentiate between closed system and open system. 3.a)

A spherical balloon contains 5 kg of air at 200 kPa and 500 K. The balloon material is b) such that the pressure inside is always proportional to the square of the diameter. Determine the work done when the volume of the balloon doubles as a result of heat transfer



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