Code No: 138FQ **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, December - 2020
BASICS OF THERMODYNAMICS
(Common to CE, EEE)

Time: 2 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
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1. What are the major differences between exact and inexact differentials and give the examples for them from thermodynamic point of view? [15]

2. What is the need of thermodynamic properties? What are different types of thermodynamic properties and explain the significance of each property. [15]

3. The internal energy of a certain fluid are given by u = 200 + 0.182T and the equation of state is PV = 0.287 (T +273), where u is the specific internal energy (kJ/kg), T is in degree centigrade pressure in kPa and V is the specific volume. Find the values of specific heat at constant pressure and constant volume using fundamental relations. [15]

4. What are different types of thermometers used for measurement of temperature? Explain. [15]

5. A reversible heat engine working between two thermal reservoirs at 875 K and 315 K drives a reversible refrigerator which operates between the same 315 K reservoir and a reservoir at 260 K. The engine is supplied 2000 kJ of heat and the network output from the composite system is 350 kJ. Calculate the heat transfer to the refrigerator and the net heat interaction with the reservoir at 315 K temperature. [15]

6.a) State and explain Kelvin Planck statement of second law of thermodynamics and how to make use of this statement?

b) Find the COP and heat transfer rate in the condenser of a refrigerator which has a refrigeration capacity of 7.5 kW. The power input to the refrigerator is 1 kW. [8+7]

7. How to convert the composition of mixture from gravimetric analysis into volumetric analysis? Explain with a suitable example. [15]

8. An air standard diesel cycle has a compression ratio of 16. The pressure at the beginning of compression stroke is 1 bar and the temperature is 25^0C. The maximum temperature is 1450^0C. Determine the thermal efficiency and the mean effective pressure for this cycle. Take γ= 1.4. [15]

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