Reg. No. : | | | | | | | | | | |

Question Paper Code: 93703

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Mechanical Engineering

19UME 303 – ENGINEERING THERMODYNAMICS

(Regulation 2019)

Duration: 1:15 hour Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The amount of heat required to rise the temperature of the unit mass of the gas through gas 10Cat constant volume , is called CO1- R

   (a) Specific heat at constant volume (b) Specific heat at constant pressure

   (c) Kilo calories (d) None of the above

2. The general law of expansion or compression is PVn = C. The processes is said to be hyperbolic, if n is equal to CO1- U

   (a) 0 (b) 1 (c) Y (d) X

3. A process in which Enthalpy remains constant is. CO2-R

   (a) Isothermal Process (b) Hyperbolic process

   (c) Adiabatic process (d) Throttling process

4. Kelvin-Plank's Law deals with CO2-R

   (a) Conservation of work into heat (b) Conservation of heat in to work

   (c) Conservation of energy into heat (d) Conservation of potential energy into work

5. Heat rate is given by (in kJ/kWh) CO3- U

   (a) cycle efficiency (b) 600 / cycle efficiency

   (c) cycle efficiency / 3600 (d)) cycle efficiency * 3600

6. Dryness fraction of the wet steam is given by CO3- R

   (a) mg / mf (b) mf / mf + mg (c) mg / mf + mg (d) mg / mf

7. The first TdS equation is CO4- U

(a) $TdS=Cv*dT + T(\partial T/\partial p)dV$ (b) $TdS=Cv*dT - T(\partial p/\partial T)dV$

(c) $TdS=Cv*dT + T(\partial p/\partial T)d$ (d) $TdS=Cv*dT - T(\partial T/\partial p)dV$

8. The energy equation is given by CO4- R

(a) $(\partial U/\partial V) = T*(\partial p/\partial T) + p$ (b) $(\partial U/\partial V) = T*(\partial p/\partial T) - p$

(c) $(\partial U/\partial V) = -T*(\partial p/\partial T) - p$ (d) $(\partial U/\partial V) = p - T*(\partial p/\partial T)$

9. Heating and humidification is done in CO5- U

(a) Summer air conditioning (b) Winter air conditioning

(c) Both (a) & (b) (d) All of the above

10. The wet bulb temperature is the ____ temperature recorded by moistened bulb. CO5- U

(a) Lowest (b) Highest

(c) Atmospheric (d) None of the above

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. A Nozzle is a device for increasing velocity of a steadily flowing steam,at inlet to certain nozzle the enthalpy of fluid is 3000KJ/Kg and the velocity is 60 m/s at discharge end enthalpy is 2762 KJ/Kg.The nozzle is horizontal and there is negligible heat loss from it. CO1- App (8)
    (i) Find the velocity at exist from nozzle
    (ii) If inlet area is 0.1 m^2 and specific volume at inlet is 0.187 m^3 /Kg. Find the mass flow rate
    (iii) If the specific volume at exit is 0.498 m^3/Kg. Find the exit area at nozzle
12. Explain the working principle of Carnot cycle and derive the Efficiency of carnot cycle in terms of temperature from its p-v diagram. CO2- U (8)
13. Discuss the different phase change zones of T-S Diagram for water when the temperature rises from solid phase to superheated phase CO3- U (8)
14. Derive the Maxwell relations and explain their importance in thermodynamics. CO4-App (8)
15. Explain the various psychometric process with neat sketches. CO5- U (8)