INTERNAL ASSESSMENT TEST – 1

Dept: ME	Sem / Div: 4th	Sub:Applied Thermodynamics	S Code: 18ME42
Dt:24/05/2021	Time:3.-4.:30 pm	Max Marks: 50	Elective: N

Note: Answer any 2 full questions.

QN		Questions	Mark	RBT	CO's
		Part A			
1	a	With a neat sketch, explain the working of winter air conditioning system. Show the process on psychrometric chart.	6	L2	CO4
	b	A stream of air at 760 mm of Hg, 20^0 C DBT and 30% RH flows at a rate of 15 m^3/min is mixing adiabatically with another stream of air at 760 mm of Hg, 30^0 C DBT and 80% RH flowing at the rate of 20 m^3/min. Calculate for the mixed stream: i) Dry bulb temperature, ii) Specific humidity iii) Enthalpy.	9	L3	CO4
	c	An air conditioning plant is required to supply 60 m^3 of air per minute at a DBT of 21^0C and 55% RH. The outside air is at DBT of 28^0C and 60% RH. Determine the mass of water drained and capacity of the cooling coil. Assume that the required conditioning is achieved first by cooling and dehumidification and then by heating.	10	L3	CO4
		OR			
2	a	Explain the following terms : 1.Specific humidity 2.Relative humidity 3.Dew point temperature 4.Degree of Saturation. 5.Wet bulb temperature	10	L2	CO4
	b	A sling pschrometer reads 40^0 C DBT and 28^0 C WBT. Without using pschrometric chart. Calculate the following 1.Specific humidity 2. Relative humidity 3.Dew point temperature 4.Enthalpy of the mixture per kg of dry air.5.Vapour density.	10	L3	CO4
	c	Obtain the expression for specific humidity.	5	L2	CO4
		Part B			
3	a	Derive the expression for efficiency of a Brayton cycle With a neat T-S and P-V diagrams.	10	L3	CO2
	b	For a hall to be air conditioned ,the following conditions are given. Outdoor conditions 40^0 C DBT,20^0 C WBT,required Indoor conditions are 20^0 C DBT,60% RH.Seating capacity of the hall - 1500.amount of Outdoor air supplied is 0.3 m^3/min per person. If the required condition is achieved first by adiabatic humifidication and then by cooling. Estimate i) Capacity of cooling coil in tons ii) Capacity of humidifier in kg/hr.	10	L3	CO4
	c	Explain the requirements of comfort air conditioning system.	5	L3	CO4
		OR			
4	a	Explain the working of Open cycle gas turbine	5	L2	CO2
	b	Air enters the gas turbine plant operating on a Brayton cycle at a	10	L3	CO2

		pressure of 1 bar and 27° C. The Pressure ratio in the cycle is 8 bar. Calculate the maximum temperature in the cycle and the cycle efficiency .Assume that the turbine work is two times the compressor work.Take adiabatic index $\gamma = 1.4$			
	c	Explain the method of improving the efficiency of a gas turbine by using a Regenrator.	10	L3	CO2