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Code No: RT31351

R13

SET - 1

III B. Tech I Semester Supplementary Examinations, October/November - 2018 THERMODYNAMICS AND REFRIGERATION SYSTEMS

(Agricultural Engineering)

-	Time: 3 hours Max.		Marks: 70	
_		Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. Answering the question in Part-A is compulsory 3. Answer any THREE Questions from Part-B		
		<u>PART –A</u>		
1	a)	State zeroth law of thermodynamics.	[3M]	
	b)	What is the importance of heat balance sheet?	[4M]	
	c)	Define refrigering capacity	[3M]	
	d)	Define multistage compression.	[4M]	
	e)	What are the desirable requirements of a Refrigerant - Absorption pair?	[4M]	
	f)	Define Relative humidity and specific humidity.	[4M]	
		PART -B		
2	a)	Distinguish between:	[6M]	
	,	i) Heat and Work ii) Closed system and open system iii) Intensive and extensive properties	. ,	
	b)	A gas undergoes a thermodynamic cycle consisting of three processes beginning at an initial state where p_1 = 1bar, V_1 =1.5 m ³ and U_1 = 512 kJ. The processes are as follows: i) Process 1-2: Compression with pV= Constant to p_2 = 2 bar, U_2 = 690 kJ ii) Process 2-3: W_{23} = 0, Q_{23} = -150 kJ, and	[10M]	
		iii) Process 3-1: W_{31} = +50 kJ. Neglecting KE and PE changes, determine the heat reactions Q_{12} and Q_{31} .		
	a)	50 kg of water is at 313 K and enough ice at -5° C is mixed with water in an adiabatic vessel such that at the end of the process all the ice melts and water at 0° C is obtained. Find the mass of ice required and the entropy change of water and ice. Given C_p of water = 4.2 kJ/kgK, C_p of ice= 2.1 kJ/kgK and latent heat of ice = 335 kJ/kg.	[8M]	
	b)	With neat sketches explain the working of a 4 stroke Petrol engine.	[8M]	
	a)	R12 saturated liquid at 35°C is throttled to a pressure corresponding to a temperature of 5°C. Determine the extent of flashing of the liquid into vapor.	[6M]	
	b)	Discuss the following: i) Significance of clausius inequality ii) thermoelectric cooling	[10M]	



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SET - 1 R13 Code No: RT31351 5 a) A Bell - Coleman cycle works between 1 and 6 bar pressure limits. The [8M] compression and expansion indices are 1.25 and 1.3 respectively. Obtain COP and tonnage of the unit for an airflow rate of 0.5 kg/s. Neglect clearance volume and take temperature at the beginning of compression and expansion to be 7^oC and 37^oC, respectively. A Derive equation of COP for reversed carnot Air-refrigerator show different b) [8M] processes on P-V and T-S Diagram. 6 A simple vapour compression plant produces 5 tonnes of refrigeration. The a) [8M] enthalpy values at inlet to compressor, at exit from the compressor and at exit from the condenser are 183.19, 209.41 and 74.59kJ/kg respectively. Estimate: i) The refrigerant flow rate ii) The C.O.P. iii) The power required to drive the compressor iv) The rate of heat rejection to the condenser Explain the working of a simple vapor absorption refrigeration system with a b) [8M] neat sketch. 7 List various factors that affecting on refrigerated cold storage. [6M] a) Calculate the following when the DBT is 35°C, WBT is 23°C and the b) [10M] barometer reads 750mm Hg: i) Relative humidity ii) Humidity ratio iii) DPT iv) Density v) Enthalpy of atmospheric air NWWFIELE

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