## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER-III • EXAMINATION – SUMMER 2013

Sub	ject	Code: 131404 Date: 29-05-2013	
Sub Tim	ject e: 02	Name: Food Engineering Thermodynamics2.30 pm - 05.00 pmTotal Marks: 70	
Instr	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	a.	Discuss zeroth law of thermo dynamics and concept of temperature measurement.	07
	b.	Explain first law of thermodynamics. Discuss its applications	07
Q.2	a.	Describe second law of thermodynamics along with its applicability?	07
	b.	Explain various definitions related to thermodynamics. OR	07
	b.	Write short notes - Any Two:	07
		1. Psychometric chart 2. Properties of pure substances 3. Types of equilibrium.	
Q.3	a.	Define / Explain the following (Any Four):	04
		1. Moisture balance2. Relative humidity	
		3. Heat Degree of saturation 4. Dry bulb temperature	10
	b.	Answer the following (Any Five) 1. What is diffusor?	10
		2. Explain Carnot cycle?	
		5. Explain Maxwell's equation 6. Explain Gibbs phase rule	
		OR	
Q.3	a.	<ul> <li>(i) A pump deliver a fluid in the tank at the rate of 0.032 m<sup>3</sup>/sec. The tank has has size of 1.5 metre diameter and 4.2 metre height can hold a maximum of 3000 kg fluid. Calculate the mass flow rate of fluid in kg / sec. and its density -04</li> <li>(ii) Describe heat engine-03</li> </ul>	07
	b.	Explain SI system of measurement write dimension of specific heat enthalpy	07
		electrical resistance and frequency.	
<b>Q.4</b>	a.	Discuss properties of pure substance, steam and water table and charts.	07
C	b.	Discuss the following: 1. Thermal reservoir 2. COP of heat pump and refrigerator	07
		3. Application of SFEE to open channel.	
		OR	
Q.4	a.	10 moles of an ideal gas with $\gamma = 1.4$ is compressed	07
		reversibly and adiabatically from 100 Kpa & 27°C to 1 Mpa. Determined the work	
	h	done on the gas, the change in internal energy and final temperature of the gas.	07
05	D.	Discuss steady flow energy equations (SFEE)	07
Q.5	a.	Answer the following (Any Seven)	07
		2. What is unavailable energy?	
		5. What is thermodynamics? 6. What is entrony?	
		7. What is due point temperature? 8. What is steady flow process?	
	b.	1. Explain reversible and irreversible process03	07
		2. Explain equation of state -04	

Q.5	a.	(i) Discuss deviation of real gas from ideal gas behavior - 05	07
		(ii) Explain adiabatic process-02	
	b.	(i) Discuss mixing of air stream-04	07
		(ii) Explain characteristic equation of gas-03	

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