Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1721004 **Date: 23-06-2014**

Subject Name: Radiation Heating and Cooling System

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What do you understand by Radiation? Explain Significance of Radiation heat transfer in Thermal engineering.	**07**
	(b)	Which are the various radiant heating systems used in practice? Explain any one briefly.	**07**
Q.2	**(a)**	Define óThermal Comfort as per ASHRAE standard 55(1992). Enlist different thermal comfort models. Explain in brief thermal comfort design methodology.	**07**
	(b)	Explain the benefits of typical Radiant heating and cooling system.	**07**
		OR	
	(b)	Explain with diagram Heat Transfer Modes within an enclosed space fitted with Radiant Cooling System.	**07**
Q.3	**(a)**	Write short note on : (1) Radiant Heating panels. (2) Flow Controls used for radiant heating and cooling systems.	**08**
	(b)	Explain concept of óRelative Temperature Relationshipô for forced air cooling system and radiant cooling system.	**06**
		OR	
Q.3	**(a)**	Write note on ñBrief overview of different controls of radiant systems.ò	**08**
	(b)	Discuss in brief Rohles-Nevin studies.	**06**
Q.4	**(a)**	Explain Configuration factor, Interchange factor and Irradiation with suitable examples.	**07**
	(b)	Explain Gagge two node thermal comfort model with a schematic diagram.	**07**
		OR	
Q.4	**(a)**	Explain the following : 1. Stefan-Boltzmannôs law 2. Blackbody radiation 3. Wienôs displacement law 4. Newtonôs law of cooling	**08**
	(b)	Explain the operation of a bimetallic thermostat for temperature control.	**06**
Q.5	**(a)**	What do you understand by Control volume? Discuss the important characteristics of control volume.	**07**
	(b)	The flat roof of a hemispherical furnace is at 800 K and has a emissivity of 0.5.The corresponding values for the hemispherical roof are 1200 K and 0.25.Determine the net radiation heat transfer from the roof to floor.	**07**
		OR	
Q.5	**(a)**	Write short note on ñImpact of control Choiceò on energy consumption for the radiant system.	**06**
	(b)	Write short note on Computer aided design tools for radiant systems. Explain the concept of Mean Radiant Temperature and Operative temperature.	**08**

****