Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2722108 **Date: 25/05/2016**

Subject Name: Solar Energy Engineering

Time:10:30 am to 01:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of solar energy data book after verification.**

Q.1	**(a)**	Describe the method for computing solar radiation on inclined surfaces.	**07**
	(b)	Describe the tracking requirements of a Compound Parabolic Concentrating Collector (CPC).	**07**
Q.2	**(a)**	Determine the collector top loss coefficient for a single glass cover with the following specifications: Plate ï to ï cover spacing = 25 mm Plate emittance = 0.95 Ambient temperature = 10 °C Mean plate temperature = 100 °C Collector tilt = 45 °C Wind heat transfer coefficient = 10 W/m^2°C	**07**
	(b)	Define the following parameters for solar concentrators: (1) Aperture area (2) Absorber area (3) Optical efficiency (4) Intercept factor (5) Instantaneous thermal efficiency (6) acceptance angle (7) Geometrical concentration ratio	**07**
		OR	
	(b)	Explain about the collector testing methods and how test data are presented in useful ways?	**07**
Q.3	**(a)**	Discuss in brief classification of concentric solar collectors.	**07**
	(b)	Discuss briefly about the materials used for solar concentrators to achieve good results and long life.	**07**
		OR	
Q.3	**(a)**	Discuss the parameters affecting the performance of solar flat collectors.	**07**
	(b)	What are the different types of solar air heating collectors? Explain with neat sketch.	**07**
Q.4	**(a)**	What is thermal storage wall? What are the different concepts employed to make the thermal storage wall?	**07**
	(b)	Discuss about the desirable properties of phase change heat exchange materials and also give an overview of major technique of storage of solar thermal energy.	**07**
		OR	
Q.4	**(a)**	Discuss about the passive cooling of buildings. List the different ways for passive cooling of buildings and explain any one of them.	**07**
	(b)	Differentiate between concentric and non concentric type solar collectors.	**07**
Q.5	**(a)**	Explain the f-chart method for designing solar active systems.	**07**
	(b)	Discuss and compared the life cycle cost method for solar and conventional system.	**07**
		OR	
Q.5	**(a)**	Discuss with neat sketch: (1) Solar still (2) Solar dehumidifier	**07**
	(b)	Explain: The P_1, P_2 method for life cycle solar savings.	**07**