Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER – I (NEW) EXAMINATION – SUMMER 2017

Subject Code:2712109 **Date:11/05/2017**

Subject Name: Renewable Energy Engineering

Time:02:30 P.M. to 05:00 P.M. **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 are the different types of ocean energy from which power can be harnessed? Differentiate between Wave energy and Tidal energy.	**07**
	(b)	Discuss with a neat sketch, various components of wind energy conversion system.	**07**
Q.2	**(a)**	Discuss with sketch KVIC-Biogas Plant.	**07**
	(b)	Discuss environmental impact of fossil fuels and hence the need of renewable energy engineering.	**07**
		OR	
	(b)	Find the incidence angle made by beam radiation with normal to a flat plate collector on 1st December at 9 a.m. the collector is located at a place (28.58N and 77.20^0E) and tilted at an angle 38^0 with horizontal and pointing due south.	**07**
Q.3	**(a)**	Discuss about biomass energy programme in India	**07**
	(b)	What are the applications of fuel cell? Discuss with sketch PAFC.	**07**
		OR	
Q.3	**(a)**	Enumerate various types of solar cell. Discuss the characteristics controlling the solar cell performance. Mention various applications of solar cell.	**07**
	(b)		**07**
Q.4	**(a)**	Define: Tide, Ebb, Spring Tide, Neap Tide, Estuary, Tidal basin, Auxiliary basin.	**07**
	(b)	Discuss advantages of harnessing energy from waves. Estimate the power generated from tide.	**07**
		OR	
Q.4	(a)	Discuss in detail with neat sketch any one Solar Power Plant you have studied.	**07**
	(b)	What is gasifier? Explain the applications of gasifier. Discuss the problems in development of gasifier.	**07**
Q.5	**(a)**	Discuss the various solar radiation measuring instruments. Discuss in detail: sunshine recorder.	**07**
	(b)	Summarize various applications of hydrogen. Explain hydrogen as an alternative fuel for vehicles. What are the disadvantages of using hydrogen as fuel?	**07**
		OR	
Q.5	**(a)**	Define mathematically the wind power density. How does wind power per unit area vary with wind speed?	**07**

(b) At a particular site where atmospheric pressure is 1.01325 bar and temperature is 20^0C, the wind is available at 8 m/sec. determine: **07**

(i) Power density available in the wind

(ii) Max power density possible

(iii) Obtainable power density if overall efficiency is 35%

(iv) Power capacity of wind mill if its diameter is 30m.

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