Seat No.:	Enrolment No.

Subject Code: 2712109

power.

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER- I• EXAMINATION - WINTER 2014

Date: 12/01/2015

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. Explain the terminologies related to wind energy conversion, hub height, **Q.1** 07 (a) swept area, cut-in speed, pitch control, rated power, wind rose, tip speed ratio. (b) What are the factors affecting the generation of methane gas in anaerobic **07** digestion process? **Q.2** Define with sketch: air mass, extraterrestrial radiation, ground radiation, beam 07 (a) radiation, diffuse radiation, total radiation, reflected radiation. Determine the following for a location at 40°7¢N (i.e. 40.12°N) latitude at (b) 07 October 16th. (i) the zenith angle and solar azimuth at 11h LAT (ii) the sunrise angle and (iii) the day length. Discuss the advantages and disadvantages of focusing collectors over flat 07 (b) plate collectors. 0.3 What is Betz limit? Discuss the site selection criteria for wind power (a) 07 Discuss in detail the design considerations of horizontal axis wind machine. (b) 07 0.3 Explain the photovoltaic effect. Discuss the major advantages, disadvantages **07** (a) and applications of solar cell. What is fuel cell? Give the classification of fuel cell. Explain with neat sketch 07 **(b)** any one type of fuel cell. 07 **Q.4** Discuss with neat sketch KVIC design type biogas plant. (a) Differentiate (atleast two points): fixed bed gasifier and fluidized bed type, 07 (b) continuous type and bath type biogas plant, floating gas holder and fixed dome type, wet fermentation and dry fermentation. What is gasifier? Explain the applications of gasifier. Discuss the problems in **Q.4 07** (a) development of gasifier. Discuss with sketch any one system of geothermal power plant. 07 **(b)** 0.5 Summarize various applications of hydrogen. Explain the hydrogen as **07** (a) alternative fuel for vehicles. What are the disadvantages of using hydrogen as Discus with sketch the Salter Duck arrangement for wave power generation. **(b)** 07 **Q.5** Discuss with schematic arrangement and t-S diagram, open cycle OTEC 07 (a) system. Define: Spring tide and Neap tide. Discuss the estimation of tidal range 07 **(b)**