

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE SEM-IV Examination-Nov/Dec-2011****Subject code: 141904****Date: 02/12/2011****Subject Name: Non-Conventional Energy Sources****Time: 02.30 pm -5.00 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) Describe the essentiality for exploration of renewable sources of energy. **05**  
 (b) Define Solar Constant. Also explain about the variation of extraterrestrial solar radiation during the year with graph. **05**  
 (c) Differentiate between Beam Radiation and Diffuse Radiation. **04**
- Q.2** (a) Define the following terms: **08**  
 (i) Solar declination angle (ii) Solar zenith angle  
 (iii) Aperture inclination angle (iv) Solar incident angle  
 (b) Define Sunrise hour angle. Also calculate the day length in Ahmedabad ( $23^{\circ}$  N) on  $21^{\text{st}}$  December and  $21^{\text{st}}$  March. **06**
- OR**
- (b) Explain briefly construction and working of Sunshine Recorder. **06**
- Q.3** (a) Describe briefly construction and working of a typical flat plate solar collector for air heating with figure. **07**  
 (b) List different types of concentrating collectors. Explain any one with figure. **07**
- OR**
- Q.3** (a) Explain construction and working of a forced circulation type Solar Dryer with neat figure. **07**  
 (b) Describe working of Solar Pond as energy storage with the help of neat sketch. **07**
- Q.4** (a) Give detailed classification of Wind Mills. **06**  
 (b) Describe the method of site selections for installing wind mills. **06**  
 (c) Define: (i) Total Wind Power Density (ii) Power Coefficient **02**
- OR**
- Q.4** (a) Explain about the factors affecting on biogas production for a typical biogas plant. **05**  
 (b) Describe working of fixed dome biogas plant briefly with figure. Also write its demerits. **05**  
 (c) Write brief note on conversion efficiency of a typical fuel cell. **04**
- Q.5** (a) Describe with neat figure Vapour Dominated (dry steam) type geothermal power plant. **05**  
 (b) Write short note on Scope for Geothermal Energy in India. **05**  
 (c) Describe about the basic methods of Hydrogen storage. **04**
- OR**
- Q.5** (a) Write advantages and disadvantages of Wave energy. **05**  
 (b) Explain with figure basic working principle of MHD system. **05**  
 (c) Describe about primary energy audit and detailed energy audit method. **04**

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