# GUJARAT TECHNOLOGICAL UNIVERSITY
### BE- IVth SEMESTER–EXAMINATION – MAY/JUNE- 2012

**Subject code: 141904**                                      **Date: 31/05/2012**
**Subject Name: Non-conventional Energy Sources**
**Time: 10:30 am – 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.**

**Q.1** (a) Define following terms: Beam radiation, air mass, declination angle, hour angle.    **07**

     (b) Explain reserves, production and utilization of primary energy sources in India.    **07**

**Q.2**

     (a) Wind at 1 bar and 15°C has a velocity of 15m/s calculate    **07**
           i. Total power density in wind stream,
           ii. Maximum obtainable power density,
           iii. Power density obtainable at 35% of total power,
           iv. Power, torque and axial thrust.
      Assume turbine diameter=120m operating speed 40 at maximum RPM

     (b) With neat sketch explain construction and working of solar still.    **07**

<p align="center"><b>OR</b></p>

     (b) List advantages and disadvantages of wind energy conversion system.    **07**

**Q.3**

     (a) Explain effect of following factors on performance of biogas generation.    **07**
           i. PH value,
           ii. Diameter to depth ratio,
           iii. Pressure,
           iv. Seeding,

     (b) List application of geothermal energy and potential of availability prospects in India.    **07**

<p align="center"><b>OR</b></p>

**Q.3** (a) Explain constructional details and working of KVIC digester.    **07**
     (b) Write brief note on hot dry rock resource.    **07**

**Q.4**

     (a) State different types of wave energy conversion devices and explain any one.    **07**

     (b) Explain strategy and principles for energy conservation.    **07**

<p align="center"><b>OR</b></p>

**Q. 4** (a) Describe the closed cycle OTEC power plant and state its advantages over open cycle system.    **07**

     (b) Explain following : energy economics, energy audit, energy planning    **07**

**Q.5**

     (a) Describe an MHD open cycle system. What are main advantages of an MHD power generation?    **07**

     (b) How are fuel cells classified? Explain any one with neat sketch    **07**

<p align="center"><b>OR</b></p>

**Q.5** (a) What are important factors to be considered while selecting materials in MHD power generation?    **07**

     (b) State and explain various methods used in practice for storage of hydrogen and problems associated with it?    **07**

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