Mech Rev

B.E - VIII / Mech / Ele - II - Non Conventional Energy Sourc

30.11.12

VT-S.H.Exam. Nov.-12-18

Con. 9640–12. **(REVISED COURSE)** **KR–4524**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** questions from the remaining **six** questions.
(3) Assume **suitable** data if **necessary**.
(4) **Figures** to the **right** indicate **full** marks.

1. (a) List different Methods of harnessing solar energy. Compare advantages and disadvantages of concentrating collectory over flat plate collector. **10**
   (b) Explain the following terms :– **10**
   (i) Solar altitude angle
   (ii) Latitude
   (iii) Hour angle
   (iv) Day length
   (v) Declination.

2. (a) What is Betz co-efficient ? Show that ideal maximum theoretical efficiency is 59% for a horizontal axis wind mill. **10**
   (b) Explain principle of Hydropower Generation with neat sketch along with problem associated with Megahydro project. **10**

3. (a) Explain different reaction phases taking place in a digester ? Mention various factors affecting generation of Biogas. **12**
   (b) Explain with neat sketch, wind Energy conversion system. **8**

4. (a) Describe principle of working of fuel cell. Compare advantage and disadvantages of different types of fuel cells. **10**
   (b) What is Geothermal energy ? Write a note on production and application of Geothermal Energy. **10**

5, (a) Explain in detail prospects of Energy plantation in India. **8**
   (b) FPC in used for heating the Building. Following are the data related to design of FPC and climate. Using these below parameters calculate :– **12**
   (i) Solar altitude angle
   (ii) Incidence angle
   (iii) Collector efficiency.
   Location and Latitude : Baroda 22°N.
   Day and time. Jan 01. 1130–1230 (IST)
   Annual average intensity of solar
   Radiation : 0·5 angley/min collector tilt : altitude + 18°
   Number of Glass coving : 2
   Heat removal factor of collector : 0·80
   Transmittance of Glass = 0·80
   Top Loss co-efficient for collector = 7 w/m^2°C
   Absorptance of the glass = 0·85
   Fluid temperature = 62 °C
   Ambient tempreture = 20°C
   Diffusive reflectance for two covers = 0·22

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6. (a) Explain in detail limitations of conventional and non-conventional sources of Energy. **8**

   (b) Following observations recorded from a test on Biogas system : **12**

   Calorific value of methane = 28 mJ/m3.
   Burner efficiency = 85%
   Number of cows : 9
   Retention period : 20 days.
   Temperature of fermentation = 30°C
   Dry matter collected/cow/day = 2·2 kg.
   Density of matter in the fluid (slurry) in the diagester : 50 kg/m3.
   Biogas yield : 22 m^3/kg of Dry input.
   Methene proportion in Biogas : 0·68.

   Determine :–

   (i) Volume of Digester

   (ii) Power available from Biogas Digester.

7. Write short note on any **four** of following :– **20**

   (a) Solar Distillator
   (b) Wood Pyrolysis
   (c) Working Principle of Pyranometer
   (d) Tidal Power Generation System
   (e) Types of Alternative Energy Sources
   (f) Site Selection for Wind Power Plant.

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