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Total Number of Pages : 02

B.Tech
PEE5J001

5th Semester Regular Examination 2017-18

Renewable Energy Systems

BRANCH : ELECTRICAL

Time: 3 Hours

Max Marks: 100

Q.CODE: B363

Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: *multiple type or dash fill up type* (2x10)

- a) Which year is said to be starting point for large scale planning of renewable energy globally?
(I)1973 (II)1942 (III)1850 (IV) 1991
- b) What is the standard value of solar constant?
(I)1KW m² (II)1.367KW m² (III)1.5KW m² (IV) 5KW m²
- c) At solar noon, the hour angle is?
(I)+90⁰ (II)-90⁰ (III)Zero (IV) -180⁰
- d) The value of concentration ratio of a flat plate collector is
(I)1 (II)10 (III)100 (IV) 1000
- e) What is the typical cooking time of a paraboloidal dish cooker?
(I)2-3 hours (II)20-30 minutes (III)20-30seconds (IV) 6-12hours
- f) The efficiency of a commercial solar cell lies in the range
(I)0-10% (II)10-20% (III)20-30% (IV) 50-60%
- g) A typical open circuit voltage of a solar cell is
(I)12V (II)6V (III)3V (IV) 0.5V
- h) The energy payback period of wind equations is
(I)1Year (II) 2Year (III) 3Year (IV) 4Year
- i) The optimum solid concentration in a biogas is
(I)37-39% (II)27-29% (III)17-19% (IV) 7-9%
- j) Storage of biomass energy is
(I)Very difficult (II) Inbuilt difficult (III)Expensive (IV) Impossible

Q2 Answer the following questions: *Short answer type* (2x10)

- a) What are primary and secondary energy sources?
- b) What do you understand by green power?
- c) What are the indirect forms of solar energy?
- d) Define concentration ratio of solar collector?
- e) What is the basic difference between an active and passive solar heating system?
- f) What do you understand by gust?
- g) Describe an expression for energy available in the wind.
- h) What do you understand by energy farming?
- i) What are the limitations of an MHD generating system?
- j) What are the present trends in micro hydro power development?

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- Q3 a)** Discuss the main features of various types of renewable and non renewable energy sources and explain the importance of non conventional energy sources in the context of global warming. **(10)**
- b)** Comment on the growth of energy sector in India. **(5)**
- Q4 a)** Explain the construction and principle of operation of a sunshine recorder. **(10)**
- b)** How does sun tracking help in energy collection by a flat plate collector. **(5)**
- Q5 a)** Discuss the principle of a solar collector. How can collector coating be used to improve the performance of a collector? **(10)**
- b)** What are the main advantages of a flat plate collector? **(5)**
- Q6 a)** Describe the principle of solar photo voltaic energy conversion system. **(10)**
- b)** Draw and explain an equivalent circuit of a practical solar PV cell. **(5)**
- Q7 a)** Sketch the diagram of a HAWT and explain the functions of its main components. **(10)**
- b)** Explain the mechanism of production of local winds. **(5)**
- Q8 a)** What are the different biomass energy sources and what is the energy yield from each of them? **(10)**
- b)** What are the factors affecting the performance of a biogas digester? **(5)**
- Q9 a)** Discuss different types of hybrid systems. **(10)**
- b)** Differentiate between wind diesel hybrid system and wind PV hybrid system. **(5)**
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