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Total Number of Pages : 02

M.TECH

M.TECH 2<sup>ND</sup> SEMESTER REGULAR EXAMINATIONS, MAY 2018

GREEN ENERGY RESOURCES AND TECHNOLOGY

Branch: PE, Subject Code:MPEPE2033

Time: 3 Hours

Max Marks : 70

**PART-A****(10 X 2=20 MARKS)****1. Answer the following questions.**

- a) What is the disadvantage of wind energy system? **(CO3)**
- b) A solar car with total roof area for solar cells of  $6.4 \text{ m}^2$  is to be designed. Calculate the electrical power available. Assuming total cell efficiency is 22% and total intensity is  $990 \text{ w/m}^2$ . **(CO2)**
- c) Why is solar energy really a form of nuclear energy? **(CO5)**
- d) Draw the power versus wind speed characteristics of a wind turbine. **(CO3)**
- e) Write the biogas production reaction for a biogas plant. **(CO4)**
- f) Define simple payback period. **(CO5)**
- g) What do you mean by retention time? **(CO1)**
- h) What do you mean by energy audit? What is the need of energy audit? **(CO1)**
- i) How many turbines does it take to make one megawatt (MW)? **(CO3)**
- j) Name different types of hybrid power systems. **(CO5)**

**PART-B****(5 X 10=50 MARKS)****Answer any five questions from the following.**

- 2a) Draw the equivalent circuit diagram of a solar PV cell and explain the V-I characteristics of PV cell. **(5) (CO2)**
- b) Briefly discuss why the efficiency of solar PV cell is less. **(5) (CO2)**
- 3a) Describe the need of dc-to-dc controller in a standalone solar PV system **(5) (CO2)**
- b) Explain advantages, disadvantages and applications of Hybrid Power Systems. **(5) (CO5)**
- 4 a) Compare Horizontal axis wind turbine and vertical axis wind turbine. **(5) (CO3)**
- b) Discuss about the impacts of renewable energy on environment. What are the principles and strategies of energy conservation? **(5) (CO1)**

- 5 a).** What are the factors affecting biogas production. Explain any one biogas plant. **(5)(CO4)**
- b)** Differentiate between Wave energy conversion system and Tidal energy conversion system. **(5) (CO3)**
- 6 a)** Briefly discuss about the different control systems in a wind energy system. **(5) (CO3)**
- b)** Define the terms  $I_{sc}$ ,  $V_{oc}$ , FF and efficiency of solar cells. **(5)(CO2)**
- 7 a)** An industry wants to install a wind turbine to generate annual energy of 50000 kWh. The wind speed at the location is 9 meter per second at a height of 10 meter from the ground. Which turbine would you suggest to the industry? Make necessary assumptions. **(5) (CO3)**
- b)** What is solar collector and explain central receiver with heliostat collector. **(5) (CO2)**
- 8. Answer the following**
- a)** Parabolic disc collector **(5) (CO2)**
- b)** VAWT **(5) (CO3)**

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