KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: APRIL/ MAY 2016

(Regulation 2009)

Eighth Semester

MECHATRONICS ENGINEERING

MCT155: Renewable Energy Sources

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The fastest-growing renewable energy resource today is
   a) Nuclear energy b) coal
   c) wind d) Hydro power
2. Green house emissions are measured in _____equivalent.
   a) oxygen b) hydrogen
   c) CO_2 d) CO
3. Solar constant is _____
   a) 140 Wm^{-2} b) 1.4 Wm^{-2}
   c) 1.4 kWm^{-2} d) 1.4 MWm^{-2}
4. A solar cell converts _____.
   a) heat energy into electrical energy b) solar energy into electrical energy
   c) heat energy into light energy d) solar energy into light energy
5. Floating generators are used in the sea to harness _____.
   a) tidal energy b) energy from OTEC power plant
   c) hydel energy d) wave energy
6. Which of the following defines Geothermal energy?
   a) Heat energy from volcanic eruptions. b) Heat energy from hot springs.
   c) Heat energy from inside the earth. d) Heat energy from rocks on Earth's surface
7. Which of the following is not a bio-mass source?
   a) Gobar gas b) coal
   c) wood d) Nuclear energy

8. Bagasse is

a) low quality coal
b) a fuel consisting of wood
c) fibrous portion of sugarcane left after extracting the juice
d) a kind of rice straw

9. Seebeck effect is used in

a) Thermionic generator
b) Thermoelectric generator
c) Hydrogen conversion system
d) Solar energy conversion system

10. One difficulty with the process of using hydrogen as a power source is that it _____.

a) is not properly understood
b) is less efficient than fossil fuels
c) requires a fuel that is a nonrenewable resource
d) requires an energy investment to begin the process

PART B (10 x 2 = 20 Marks)

11. What are the different forms of energy?
12. Name at least three green house gases responsible for global warming.
13. Write different types of solar collectors.
14. What are the different applications of solar PV system in rural area?
15. Define Tip speed ratio.
16. How the wind mills are classified?
17. Give the classification of biomass.
18. How to generate energy from agriculture wastes?
19. What are the direct energy conversion systems available?
20. What is the efficiency of solar cells energy conversion system? Why?

PART C (5 x 14 = 70 Marks)

21. a) What are the non-conventional sources of energy? Explain briefly.

(OR)

b) i) Discuss energy requirement of rural consumers and state the possible alternative source of energy to meet the demand. (7)

ii) Explain why it is necessary to develop non-conventional method of generating electrical energy. (7)

22. a) i) Explain the principle of conversion of solar energy into heat. (7)

ii) What are the main components of a flat plate solar collector? Explain the function of each component. (7)

(OR)

b) i) What are the advantages and disadvantages of PV solar energy conversion? (4)

ii) Explain any one application of solar energy conversion system. (10)

23. a) Describe the closed cycle ocean thermal energy conversion plant with its advantages over open cycle system.

(OR)

b) Explain about the horizontal axis wind mills with neat sketch and also explain about its design aspects.

24. a) Explain different types of Biogas plants.

(OR)

b) How to utilize industrial, municipal and agriculture wastes for generating energy? Explain.

25. a) Explain MHD systems with neat sketch.

(OR)

b) What is hydrogen energy conversion system? Explain its energy storage systems.

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