CBCS SCHEME

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15EE563

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Renewable Energy Sources

Time: 3 hrs. Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the causes of energy scarcity. What are the solution to energy scarcity and limitations of renewable energy sources? **(09 Marks)**

b. Explain the factors affecting energy resources development. **(04 Marks)**

c. Explain the classification energy resources. **(03 Marks)**

OR

2 a. With reference to the solar radiation geometry define the following :
Declination Angle(δ), Latitude angle(ϕ), Solar Altitude Angle(α), Surface Azimuth Angle(γ). **(06 Marks)**

b. Calculate Zenith angle of the sun at Lucknow (26.75°N) at 9.30AM on February 16, 2014. **(04 Marks)**

c. Write the short notes on the following :
i) Beam and diffuse radiation and
ii) Solar constant. **(06 Marks)**

Module-2

3 a. With a neat sketches, discuss the important parts of any flat plate collector? Discuss the material aspects of individual parts. **(08 Marks)**

b. What are the advantages and disadvantages of concentrating collectors over a flat plate collectors. **(08 Marks)**

OR

4 a. Write a notes on the following :
i) Solar water heating system
ii) Solar pond power generation. **(06 Marks)**

b. Explain the principle of solar photovoltaic power generation? What are main parts of solar PV systems? **(05 Marks)**

c. What are the major advantages and disadvantages of solar PV systems? **(05 Marks)**

Module-3

5 a. State and explain briefly the methods of hydrogen production technologies. **(05 Marks)**

b. What are the applications, advantages and disadvantages of hydrogen energy? **(07 Marks)**

c. Mention the problems associated with the development and application of hydrogen energy. **(04 Marks)**

OR

6 a. Explain the considerations and guidelines for the site selection of wind power generation. **(05 Marks)**

b. Explain any one type of geothermal based electric power generation. **(06 Marks)**

c. What are the advantages and disadvantages of horizontal – axis wind turbine? **(05 Marks)**

Module-4

7 a. Explain the theory of biomass gasification? List the classification ad applications of biomass gasifiers. **(04 Marks)**

b. Explain with figures up draft and down draft gasifiers? What are their uses above gasifiers. **(08 Marks)**

c. What are the main applications of gasifiers. **(04 Marks)**

OR

8 a. What is biogas? Explain with block diagram and main stages (process) of Anaerobic digestion. **(05 Marks)**

b. Explain the construction and working of a typical biogas plants. **(06 Marks)**

c. What are the advantages and disadvantages tidal power generation? **(05 Marks)**

Module-5

9 a. Discuss the principle and working of sea wave energy. What are the limitations sea wave energy conversion? **(05 Marks)**

b. What are the advantages and disadvantages of sea wave power? Limitations of sea wave power. **(06 Marks)**

c. Write a note on devices for harnessing wave energy. **(05 Marks)**

OR

10 a. Explain the principle of OTEC? Explain the basic Rankine cycle and its working. **(05 Marks)**

b. With block diagram, explain the working of open cycle OTEC. **(05 Marks)**

c. What are the advantages, disadvantages and benefits of OTEC? **(06 Marks)**

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