

B.E. Eighth Semester (Power Engineering) (C.B.S.)  
**Elective - I : Renewable Energy Systems**

P. Pages : 2

Time : Three Hours



KNT/KW/16/7637

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.
  11. Use of non programmable calculator is permitted.

1. a) Define Latitude Declination, Hour angle, Zenith angle with respect to solar radiation geometry. 7
- b) Estimate monthly average of daily global and diffused radiation on horizontal surface at Baroda (22'00" N, 73'10" E) in the month. of April 16. Average sunshine hours per day are 10 hours. constants  $a = 0.27$  and  $b = 0.49$ . 7

**OR**

2. a) Explain with neat sketch, pyranometer; for measurement of solar radiators. 7
- b) Write short note on solar fuel cell. 7
3. a) What are the various factors on which. performance of flat plate collector depends? Explain in brief. 7
- b) Explain with neat sketch, main components of liquid flat plate collectors. 6

**OR**

4. a) Calculate the angle made by beam radiation with the normal to a flat plate collector on Dec 1 at 09.00h (local apparent time). The collector is located in New Delhi (28° 35' N, 77°12' E), is tilted at an angle of 36° with the horizontal and pointing due south. 6
- b) Explain with neat sketch solar air heater. 7
5. a) What are the various merits and demerits of concentrating collector over flat plate type of collector? 6
- b) Write short Notes on solar pond and solar cooker. 7

**OR**

6. a) What is the principle of solar photovoltaic power generation? What are the main elements of a P.V. system? 7
- b) Write short Notes on solar furnace and parabolic collector. 6
7. a) What is principal of biogas generation? Explain factors, which affects biogas generation. 7
- b) Describe with neat sketch, down draft gasifier. 7

**OR**

8. a) What are the principal constituents of biogas? How can biogas be used as a fuel in I.C. Engine? 7
- b) Describe with neat sketch updraft gasifier. 7
9. a) Describe the main consideration in selecting a site for wind generation. 6
- b) Explain single basin tidal power plant. 7

**OR**

10. a) Describe with a neat sketch the working of a wind energy system. (WECS) with main components. 7
- b) Describe the closed cycle ocean thermal electric conversion systems with its advantages over open cycle. 6
11. a) Explain the working of close cycle MHD power generator with neat sketch. 7
- b) Explain vapour dominated geothermal power plant with neat sketch. 7

**OR**

12. a) Write short note on. 6
- i) Hot dry rock.
- ii) Petrothermal systems.
- b) Describe the principal of MHD power generation and explain open cycle MHD power generation. With neat sketch. 7

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