

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

P. Pages : 2

Time : Three Hours



**NKT/KS/17/7637**

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. Assume suitable data whenever necessary.
  9. Illustrate your answers whenever necessary with the help of neat sketches.
  10. Use of non programmable calculator is permitted.

1. a) Explain beam and diffuse radiation. 3
- b) Which instruments are used for measuring solar beam radiation, global radiation and sunshine intensity. 3
- c) Explain solar radiation geometry. Also define the terms with its value / equation - 7
- i) Solar constant
  - ii) Hour angle
  - iii) Incident angle.

**OR**

2. a) What is pyrheliometer ? Describe all types of pyrheliometer. 6
- b) Calculate the angle made by beam radiation with the normal to a flat collector on December 12<sup>th</sup> at 9.00 A.M. solar time for location at 28°35'N. The collector is tilted at an angle of latitude plus 10° with horizontal and is pointing due south. 7
3. a) Classify the solar collectors. 4
- b) State the reason with justification - 9
- i) Why space is provided between glass cover and absorber plate ?
  - ii) Why water is flowing from bottom to top in non pressurized flat plate collector ?
  - iii) Why flat plate collectors are oriented towards south in India ?

**OR**

4. a) State the material used for flat plate liquid collector with its specification for following with sizes. 6
- i) Transparent cover
  - ii) Absorber plate
  - iii) Tubes
  - iv) Insulation
  - v) Casing
- b) Explain with neat sketch, main components of flat plate air heater. 7

5. a) Write short notes on compound parabolic collector and parabolic dish collector. 7  
b) Describe the collector used in power plant for generation of electrical energy. 7

**OR**

6. a) Explain working of solar photovoltaic cell with neat sketch. 7  
b) With neat sketch explain working of non pressurised solar water heater. 7
7. a) Explain gasifier with its classification. What is pyrolysis ? 7  
b) What are the various factor which are affecting generation of biogas. 7

**OR**

8. a) How can Biogas be used in S.I. engine ? Explain working of such engine with neat sketch. 7  
b) Describe Downdraft gasifier with neat sketch. 7
9. a) Describe main site selection consideration for wind power generation. 6  
b) Explain with neat sketch of ocean thermal electric conversion open cycle (OTEC). What are the limitations of this method. 7

**OR**

10. a) Describe with neat sketch, working of wind energy conversion systems. 6  
b) Compare single basin arrangement with double basin arrangement in tidal power generation system with advantages of double basin arrangement over single basin arrangement. 7
11. a) With neat sketch explain principle of MHD power generation. 6  
b) Describe with neat sketch the principle of total flow concept compare it with other system. 7

**OR**

12. a) Describe MHD closed cycle system with advantages and disadvantages. 6  
b) Explain the schematic and thermodynamic cycle of liquid dominated single flashed system geothermal power plant. 7

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