

Faculty of Science & Technology

B.Tech. (Mechanical Engineering) Seventh Semester (CBCS) Examination

OPEN ELECTIVE–II : INTRODUCTION TO RENEWABLE ENERGY RESOURCES

Time : Three Hours]

[Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
 - (2) Solve Question 1 **OR** Question No. 2.
 - (3) Solve Question 3 **OR** Question No. 4.
 - (4) Solve Question 5 **OR** Question No. 6.
 - (5) Solve Question 7 **OR** Question No. 8.
 - (6) Solve Question 9 **OR** Question No. 10.
 - (7) Due credit will be given to neatness and adequate dimensions.
 - (8) Assume suitable data whenever necessary.
 - (9) Diagrams and chemical equations should be given whenever necessary.
 - (10) Illustrate your answers whenever necessary with the help of neat sketches.
1. (a) State the various renewable energy sources of energy. Specify the limitations associated with them. 7
 - (b) Explain the following terms : 7
 - (1) Latitude angle
 - (2) Hour angle
 - (3) Zenith angle
 - (4) Declination angle
- OR**
2. (a) Describe the main types of photo-voltaic technologies including mono-crystalline, polycrystalline and thin film. 7
 - (b) Explain the construction and working of an on grid solar Pv system. 7
 3. (a) Give the detail classification of solar collectors. Differentiate pointwise between non-concentrating and concentrating type collectors. 7
 - (b) Explain the construction and working of solar water heating system. Also state its applications, advantages and disadvantages. 7
- OR**
4. (a) Explain construction and working of solar pond based power generation plant. 7
 - (b) Explain the following system utilizing solar energy : 7
 - (i) Solar cooker
 - (ii) Solar furnace.

5. (a) What is Biomass source of energy ? Enlist and explain different sources of biomass energy. 7
(b) Classify different methods of extracting energy from biomass. Explain any one of the method in detail with the help of neat sketch. Also mention its advantages and disadvantages. 7

OR

6. (a) Explain in detail different factors affecting generation of bio-gas. 7
(b) Give the detail classification of biogas plants. Explain construction and working of Fixed Dome bio gas plant. 7
7. (a) What are the different factors considered for the selection of suitable site for wind energy power plant ? Explain in detail. 7
(b) What are the different types of wind energy conversion systems (WECS) ? Explain. Also differentiate between horizontal axis and vertical axis wind turbine systems. 7

OR

8. (a) Explain the working principle of Tidal and wave energy conversion with the help of neat sketches. Also enlist advantages and disadvantages of both. 7
(b) Explain the working of closed cycle ocean thermal energy canvas system under following points : 7
(a) Schematic (b) Construction
(c) Working (d) Advantages and disadvantages
9. (a) Explain the process of electrolysis for hydrozen production. What is the different types of electrolysis and what are their efficiencies. 7
(b) Explain the basic concept of how a fuel cell works and its main components. 7

OR

10. (a) Explain the basic principle of harnessing geothermal energy for various applications. What are the advantages of geothermal energy in terms of sustainability and environmental impact ? 7
(b) Explain the construction and working of dry steam geothermal power plant. 7