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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024**

Sixth Semester

**Electronics and Communication Engineering**

**20EEOE906 - INTRODUCTION TO RENEWABLE ENERGY SYSTEMS**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

|  | Marks | K-<br>Level | CO  |
|--|-------|-------------|-----|
| 1. Briefly explain how acid rain is formed as a result of fossil fuel combustion.                        | 2     | K2          | CO1 |
| 2. Briefly explain one government initiative in India to promote renewable energy adoption.              | 2     | K2          | CO1 |
| 3. Briefly describe the difference between onshore and offshore wind power plants.                       | 2     | K2          | CO2 |
| 4. What factors are considered when selecting a location for a wind power plant?                         | 2     | K2          | CO2 |
| 5. Explain the purpose of maximum power point tracking (MPPT) in a PV system.                            | 2     | K2          | CO3 |
| 6. Explain how photovoltaic cells convert sunlight into electricity.                                     | 2     | K2          | CO3 |
| 7. Briefly describe the difference between primary and secondary biomass resources.                      | 2     | K2          | CO4 |
| 8. Define geothermal energy and explain its source of origin.  | 2     | K2          | CO4 |
| 9. Briefly explain the difference between flood and ebb tides in the context of tidal energy extraction. | 2     | K2          | CO5 |
| 10. Explain the basic principle of operation of a fuel cell.   | 2     | K2          | CO5 |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

|  |    |    |     |
|--|----|----|-----|
| 11. a) Discuss the role of carbon dioxide in the greenhouse effect and its impact on global climate change.  | 13 | K2 | CO1 |
| <b>OR</b>  |    |    |     |
| b) Discuss the economic benefits of investing in renewable energy infrastructure for long-term sustainable development.  | 13 | K2 | CO1 |
| 12. a) Explain about operational characteristics of horizontal-axis and vertical-axis wind turbines, highlighting their respective advantages and limitations. | 13 | K2 | CO2 |

**OR**

b) Define the various challenges posed by the variable and unpredictable nature of wind energy for grid stability and reliability, considering the implications for energy markets and electricity pricing. 13 K2 CO2

13. a) Explain the basic principle of photovoltaic conversion and the operation of solar PV systems. 13 K2 CO3

**OR**

b) Explain the concept of a solar pond and how it utilizes solar energy for thermal energy storage. 13 K2 CO3

14. a) Describe in detail the operation of dry binary cycle geo thermal power plant. 13 K2 CO4

**OR**

b) Discuss and compare the following methods of biogas generation

i) Pyrolysis

6 K2 CO4

ii) Combustion

7 K2 CO4

15. a) Explain the essential features of a hydrogen–oxygen cell. Draw a suitable diagram of this cell and give the reactions took place at the electrodes. 13 K2 CO5

**OR**

b) Explain the ‘single-basin’ and ‘two-basin’ systems of tidal power harnessing. Further, discuss their advantages and limitations. 13 K2 CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Evaluate the economic and environmental benefits of hybrid energy systems compared to standalone renewable energy installations, considering factors such as resource availability, system efficiency, and capital costs. 15 K5 CO5

**OR**

b) Describe in detail how biomass conversion takes place and also evaluate the potential environmental impacts of large-scale monoculture plantations for biomass feedstock production. 15 K5 CO4