**20EE505/PE52**

**Hall Ticket Number:**

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| **III B.Tech (Supplementary) DEGREE EXAMINATION** | | | |
| **July/August,2023** | **Electrical & Electronics Engineering** | | |
| **Fifth Semester** | **Renewable Energy Sources** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X14=56 Marks) |

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| 1. | a) | Define Solar constant | CO1 | L1 | 1M |
|  | b) | What are the advantages of concentrating collectors? | CO1 | L2 | 1M |
|  | c) | Define Azimuth angle. | CO1 | L1 | 1M |
|  | d) | What is beam radiation? | CO1 | L1 | 1M |
|  | e) | How do you represent a solar cell on a circuit? | CO2 | L3 | 1M |
|  | f) | Define Fermi energy level. | CO2 | L1 | 1M |
|  | g) | What is shadow effect on solar cell? | CO2 | L2 | 1M |
|  | h) | State different switching devices used in Solar PV system. | CO2 | L2 | 1M |
|  | i) | What is cut in speed? | CO3 | L1 | 1M |
|  | j) | What is the importance of yaw drive mechanism? | CO3 | L2 | 1M |
|  | k) | Define tip-speed ratio | CO3 | L1 | 1M |
|  | l) | What is the main purpose of smart grid? | CO4 | L2 | 1M |
|  | m) | List out smart grid components. | CO4 | L1 | 1M |
|  | n) | Types of communication system used in smart grid | CO4 | L3 | 1M |
| **Unit -I** | | | | | |
| 2. | a) | What is meant by renewable energy source? Write differences between conventional and renewable energy sources in detail. | CO1 | L2 | 7M |
|  | b) | Derive solar radiation on tilted surface with necessary equations. | CO1 | L3 | 7M |
|  |  | **(OR)** |  |  |  |
| 3. | a) | Explain the various types of measuring instruments for Solar Radiation. | CO1 | L2 | 7M |
|  | b) | Explain the working of solar pond | CO1 | L1 | 7M |
|  |  | **Unit -II** |  |  |  |
| 4. | a) | Explain the principle and operation of a solar cell in detail? | CO2 | L2 | 7M |
|  | b) | Explain the I-V & P-V characteristics of a Solar cell with neat sketch. | CO2 | L3 | 7M |
|  |  | **(OR)** |  |  |  |
| 5. | a) | Discuss in brief, the steps involved in PV Plant design. | CO2 | L4 | 7M |
|  | b) | Discuss the requirements for the site selection of a PV plant | CO2 | L2 | 7M |
|  |  | **Unit -III** | |  |  |
| 6. | a) | Give a brief description on types of wind turbines. | CO3 | L3 | 7M |
|  | b) | Derive an expression for maximum power coefficient for a horizontal axis wind turbine. | CO3 | L4 | 7M |
|  |  | **(OR)** |  |  |  |
| 7. | a) | Explain the advantages and limitations of wind energy conversion systems. | CO3 | L1 | 7M |
|  | b) | With the help of block diagram explain the functions of various blocks of a WECS | CO3 | L3 | 7M |
|  |  | **Unit -IV** |  |  |  |
| 8. | a) | Draw the architecture of a smart grid and explain function of major components | CO4 | L1 | 7M |
|  | b) | Describe and explain the power quality issues of grid connected  renewable energy source | CO4 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 9. | a) | Explain how the reliability of smart grid can be enhanced by integrating intelligent electronic Devices in to it | CO4 | L3 | 7M |
|  | b) | Explain how automatic meter reading can make the system smarter | CO4 | L2 | 7M |

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