**20EE505/PE**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Electrical and Electronics Engineering** | | |
| **Fifth Semester** | **Renewable Energy Sources** | | |
| **Time:** Three Hours | | **Maximum:**70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | | M |
| 1 | a) | Define the term Altitude angle. | CO1 | L1 | | 1M |
|  | b) | What is beam radiation? | CO1 | L1 | | 1M |
|  | c) | What are the instruments for measuring solar radiation? | CO1 | L1 | | 1M |
|  | d) | What is Solar cell rating? | CO2 | L1 | | 1M |
|  | e) | Draw the equivalent circuit of a Solar cell. | CO2 | L1 | | 1M |
|  | f) | Classify solar collectors. | CO2 | L1 | | 1M |
|  | g) | What is cut in speed? | CO3 | L1 | | 1M |
|  | h) | Define wind shear. | CO3 | L1 | | 1M |
|  | i) | What are the types of winds? | CO3 | L1 | | 1M |
|  | j) | Define the tip speed ratio of wind turbines. | CO3 | L1 | | 1M |
|  | k) | Distinguish between grid and smart grid. | CO4 | L1 | | 1M |
|  | l) | State the advantages associated with integration of renewable energy source with smart grid? | CO4 | L1 | | 1M |
|  | m) | What are the components of smart grid? | CO4 | L1 | | 1M |
|  | n) | Define photo voltaic effect. | CO2 | L1 | | 1M |
| **Unit-I** | | | | | | |
| 2 | a) | Explain the differences between renewable and non-renewable energy sources. | CO1 | L2 | | 7M |
|  | b) | Explain in detail about the Beam radiation and diffuse radiation. | CO1 | L2 | | 7M |
| **(OR)** | | | | | | |
| 3 | a) | Explain the principle of operation of any one instrument used for solar radiation measurement with the help of a diagram. | CO1 | L2 | | 7M |
|  | b) | What are the advantages and disadvantages of concentrating collectors over flat plate collectors. | CO1 | L4 | | 7M |
| **Unit-II** | | | | | | |
| 4 | a) | Explain the current – voltage characteristics of a Solar cell and define Fill factor and give its significance. | CO2 | L2 | | 7M |
|  | b) | List and explain the different losses that lead to the less efficiency of a Solar cell. | CO2 | L3 | | 7M |
| **(OR)** | | | | | | |
| 5 |  | Explain the steps involved in PV Plant design with simple example. | CO2 | L3 | 14M | |
| **Unit-III** | | | | | | |
| 6 | a) | List the main considerations for selecting a site for wind generator. | CO3 | L1 | | 7M |
|  | b) | What types of generators are used in wind energy conversion system? Explain each one in detail. | CO3 | L1 | | 7M |
| **(OR)** | | | | | | |
| 7 | a) | Explain the working of Wind Energy Conversion System (WECS) with main components. | CO3 | L2 | | 7M |
|  | b) | What are advantages of vertical axis machines over horizontal type? Explain. | CO3 | L1 | | 7M |
| **Unit-IV** | | | | | | |
| 8 | a) | Explain in detail compare todays grid with smart grid. | CO4 | L2 | | 7M |
|  | b) | With neat sketch, Explain functions of major components of a smart grid. | CO4 | L2 | | 7M |
| **(OR)** | | | | | | |
| 9 | a) | State the power quality issues of grid connected renewable energy source? Explain in detail. | CO4 | L3 | | 7M |
|  | b) | Discuss about new trends in smart grid and energy technologies. | CO4 | L3 | | 7M |

