**20EE604/JO65**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July/August, 2023** | **Electrical & Electronics Engineering** | | |
| **Sixth Semester** | **Solar PV and Wind Plant Design** | | |
| **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) | What are the land requirements of solar PV system? | CO1 | L1 | 1 M |
|  | b) | Define solar module. | CO1 | L1 | 1 M |
|  | c) | What is a power condition unit? | CO1 | L1 | 1 M |
|  | d) | What are various sources of losses in solar system? | CO1 | L1 | 1 M |
|  | e) | Define Fill factor. | CO2 | L1 | 1 M |
|  | f) | What are different types of solar radiations? | CO2 | L1 | 1 M |
|  | g) | Define tilt angle. | CO2 | L1 | 1 M |
|  | h) | What are the different types of wind energy converters? | CO3 | L1 | 1 M |
|  | i) | Write the different components in wind energy converters. | CO3 | L1 | 1 M |
|  | j) | What are the obstacles to wind flow? | CO3 | L1 | 1 M |
|  | k) | What is meant by micro wind turbine? | CO4 | L1 | 1 M |
|  | l) | Write the safety aspects of wind turbines. | CO4 | L1 | 1 M |
|  | m) | Write Aerodynamics of wind turbine. | CO4 | L1 | 1 M |
|  | n) | What is the formula for wind turbine efficiency? | CO4 | L1 | 1 M |
| **Unit-I** | | | | | |
| 2 | a) | What are different types of solar cells and explain them clearly. | CO1 | L2 | 7M |
|  | b) | Explain how solar photovoltaic cell generates electricity in detail. | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Construct Single line diagram of Net Metering solar power system and explain various stages. | CO1 | L3 | 7M |
|  | b) | Explain the concept of battery storage in solar PV systems. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Explain the factors to be considered to select the site for solar power plant. | CO2 | L2 | 7M |
|  | b) | Explain with a neat sketch, the working principle of a grid connected solar system | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Interpret the PV module structure inter row spacing calculation. | CO2 | L2 | 7M |
|  | b) | Explain Off-Grid solar power plant with neat sketch. | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | What are the advantages and disadvantages of wind energy systems. | CO3 | L2 | 7M |
|  | b) | Explain in detail the need and functioning of Pitch angle control and Yaw Control in Horizontal Axis Wind Turbine. | CO3 | L2 | 7M |
| **(OR)** | | | | | |
| 7 | a) | With the help of a diagram, explain the working of a wind energy conversion system. | CO3 | L2 | 7M |
|  | b) | Compare Horizontal axis and vertical axis wind turbines. | CO3 | L4 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Explain the operation and challenge of offshore wind farms. | CO4 | L2 | 7M |
|  | b) | Explain components of small hydro power plant. | CO4 | L2 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Interpret the blade elemental theory. | CO4 | L2 | 7M |
|  | b) | Develop the expression for Betz limit. | CO4 | L3 | 7M |

