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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 11- 01- 2025 **Time:** 01:00 pm – 04:00 pm |

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| **School:** SOE | **Program**: B. Tech. (EEE) | |
| **Course Code :** EEE3024 | **Course Name:** Solar Photovoltaic and Wind Energy Systems | |
| **Semester**: III | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **24** | **24** | **26** | **26** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | How does renewable energy usage impact on the country’s economy? | **2 Marks** | **L1** | **CO1** |
| **2** | How is bio-mass energy generated? Mention any two advantages? | **2 Marks** | **L1** | **CO1** |
| **3** | Define the terms: (i) Solar array and (ii) Solar module. | **2 Marks** | **L1** | **CO2** |
| **4** | List out two limitations of solar energy harvest? | **2 Marks** | **L1** | **CO2** |
| **5** | List out two main limitations of wind energy? | **2 Marks** | **L1** | **CO3** |
| **6** | Mention the important components of the windmill? | **2 Marks** | **L1** | **CO3** |
| **7** | What are the limitations of wind energy systems? | **2 Marks** | **L1** | **CO3** |
| **8** | What is an integrated energy system? | **2 Marks** | **L1** | **CO4** |
| **9** | Mention the importance of integrated energy systems? | **2 Marks** | **L1** | **CO4** |
| **10** | Why does cost benefit analysis play a significant role in integrated energy systems? | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks.** | | | | | |
| **11.** | **a.** | Summarize the need for the energy transition in concerns with environment and resource depletion. | **10Marks** | **L2** | **CO1** |
|  | **b.** | Outline the importance of energy in modern society. | **10Marks** | **L2** | **CO1** |
| **or** | | | | | |
| **12.** | **a.** | Illustrate the characteristics of infrastructure, economic impact and resource availability using conventional energy sources. | **10Marks** | **L2** | **CO1** |
|  | **b.** | Illustrate the challenges faced during harnessing and using renewable energy sources. | **10Marks** | **L2** | **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.** | Explain the Maximum Power Point (MPP) with P-V and I-V curves when the load is connected to a solar photo voltaic system. | **10Marks** | **L2** | **CO2** |
|  | **b.** | Show how solar energy is harvested to obtain different forms of energy for local and commercial usage. | **10Marks** | **L2** | **CO2** |
| **or** | | | | | |
| **14.** | **a.** | Compare and explain the different configurations of Solar Photovoltaic (SPV) systems. | **10Marks** | **L2** | **CO2** |
|  | **b.** | With a suitable block diagram, explain the On-grid connected solar photovoltaic system operation having the battery backup and other interface and synchronization features. | **10Marks** | **L2** | **CO2** |

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| **15.** | **a.** | Explain any two types of windmills used to harvest wind energy? | **10Marks** | **L2** | **CO3** |
|  | **b.** | Explain the constant speed and constant frequency type generator scheme employed in wind energy system? | **10Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.** | With a neat diagram, explain the grid connected induction generator arrangement for power delivery. | **10Marks** | **L2** | **CO3** |
|  | **b.** | Explain the variable speed and variable frequency type generator scheme employed in wind energy system? | **10Marks** | **L2** | **CO3** |

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| **17.** | **a.** | Develop a hybrid integrated system containing solar energy, wind energy, hydro and thermal energy system for delivering power to customers? | **10Marks** | **L3** | **CO4** |
|  | **b.** | With a neat diagram, construct a hybrid power system containing energy sources delivering power to customers in series configuration. | **10Marks** | **L3** | **CO4** |
| **Or** | | | | | |
| **18.** | **a.** | With neat diagram, construct a hybrid power system containing conventional and renewable energy sources delivering power to customer in parallel configuration. | **10Marks** | **L3** | **CO4** |
|  | **b.** | Analyze the cost benefit impact on the hybrid integrated energy system? | **10Marks** | **L3** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***