**Registration no.:** | | | | | | | | | | |

**Total Number of Pages: 02** **B.Tech**
**REL5D005**

**5th/ 7th Semester Regular/Back Examination: 2024-25**
**RENEWABLE POWER GENERATION SYSTEMS**
**Branch: CST, CSEAI, CSE, CSEAIME, EEE, ELECTRICAL**
**Time: 3 Hours**
**Max Marks: 100**
**Q.Code: R237**
**Answer all questions of Part-A, any 08 questions of (Part-B) and any two from Part-C.**
**The figures in the right-hand margin indicate marks.**

**Part- I**

**Q1** **Objective Answer Type Questions (Answer All):** **(02x10)**

**a)** Give two examples of non-renewable small-scale distributed generation sources.
**b)** Name two MPPT methods with brief explanation.
**c)** A solar cell is basically a current source, controlled by flux of radiation: True or False. Comment with justification.
**d)** What is the basic difference between an active and passive Solar Heating systems?
**e)** What is Betz limit and how does it affect the design of wind turbines?
**f)** Describe an expression for energy available in the wind.
**g)** Comment on the range of wind speed which is considered to be favorable for wind power generation.
**h)** In modern wind electricity generating system, the blades are usually made of using which material?
**i)** State the advantages of a Diesel-PV system.
**j)** What is Pyrolysis? Briefly explain.

**Part- II**

**Q2** **Focused-Short Answer Type Questions- (Answer Any Eight)** **(06x08)**

**a)** Explain, what is maximum power point tracking (MPPT) in PV system?
**b)** Explain the working of a solar cooker.
**c)** Explain about Solar Cell, Solar PV Module, Solar PV Panel, and Solar PV Array.
**d)** Write a short note on Solar desalination systems.
**e)** Give the layout and working of wind electricity generation power plant.
**f)** Define Tip Speed Ratio (TSR) and derive an expression for it.
**g)** What do you mean by pitch angle? How pitch angle can be controlled in wind energy conversion system.
**h)** Derive the expression to obtain maximum torque on wind Turbine rotor.
**i)** Why reactive power compensation is required in wind firms and how is it provided? Explain.
**j)** What is Anaerobic digestion? Explain.
**k)** Explain the challenges in generating power from biomass.
**l)** Write a short note on Wind-PV system.

## Part-III

**Long Answer Type Questions (Answer Any Two)**

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|---|---|---|
| **Q3** | Explain constructional details and the working principle of a flat plate solar collector? Explain its merits and demerits. Explain the effect of partial or complete shadowing on a solar cell in a PV module. | **(6+6+4)** |
| **Q4 a)** | Differentiate between Horizontal Axis Wind Turbine (HAWT) and Vertical Axis Wind Turbine (VAWT). | **(8)** |
| **b)** | Explain the construction and working principle of doubly-fed-induction-generator (DFIG). Discuss its merits and demerits | **(8)** |
| **Q5** | What is biomass energy? State the advantages and disadvantages of Biomass energy. Explain the process of commercial production of ethanol from biomass. | **(2+8+6)** |
| **Q6** | What are the merits of hybrid renewable power systems? Explain various types of electric and hybrid electric vehicles. Write a short note on Microhydel-PV and Biomass-Diesel systems. | **(4x4)** |