Sub Code: MPST111 **ROLL NO.**

Model Question Paper

COURSE: M.TECH. **BRANCH**: POWER SYSTEM

SEMESTER: 1. **SUBJECT**: RENEWABLE ENERGY SYSTEM

Duration: 3:00 hrs **Max marks: 100**

Note: Attempt all questions.

1. **Attempt any four parts of the following.** **5x4 = 20**

   A. Draw and Explain the VI characteristics of a solar cell. How does temperature affect the performance of solar cell?

   B. Explain the terms solidity, pitch angle, tip speed ratio, cut-in speed and cut speed of wind turbine.

   C. Explain the necessity of energy storage in renewable power harnessing? Give the diagram and explain the operation of a pumped energy storage system.

   D. With the aid of a neat diagram, explain the working of a central tower collector type solar thermal electric plant.

   E. What are fuel cells? Mention few applications of fuel cells.

2. **Attempt any four parts of the following.** **5x4 = 20**

   A. Discuss the effect of temperature and insulation on the characteristics of solar cell.

   B. Draw the P-V characteristics of Solar cell under varying temperature and irradiation level.

   C. Compare the construction and performance of floating drum type and fixed dome type biogas plants with the help of neat sketches.

   D. Explain the factors that affect the nature of wind in an area.

   E. Discuss the Impact of Distributed Generation on the Power System?

3. **Attempt any two parts of the following.** **10x2=20**

   A. The following data relate to a wind turbine:
   Velocity of wind at 150C= 10 m/s
   Turbine diameter=10m, Operating speed of the machine=35 rpm at maximum efficiency of 40% Calculate:
   i) Total power density in the wind stream
   ii) The maximum power density
   iii) The actual power density
   iv) Power output of the turbine

   B. What are concentrating collectors? What is the need for orientation in concentrating collectors? Explain briefly the various types of concentrating collectors.

   C. Calculate the sunset hour angle and day length at location latitude of 350N, on Feb 14.

4. Attempt any two parts of the following. 10x2=20

A. Discuss micro turbine explaining types of micro turbine and also illustrating its applications.

B. Describe the Power Electronics Interface with the Grid.

C. Explain Distributed generation of electricity and its environmental impacts. Discuss the energy source those are popular in distributed generation?

5. Attempt any two parts of the following. 10x2=20

A. Discuss the role of Decentralized Distributed generation in economic development in a nation in detail.

B. Explain the necessity of energy storage in renewable power harnessing? Give the diagram and explain the operation of a pumped energy storage system.

C. Draw the layout of a double basin tidal power plant and label all the components. Explain the function of each component.