

School of Engineering**B.TECH Electrical Engineering
Semester End Examination - Jun 2024****Duration : 180 Minutes
Max Marks : 100****Sem VI - G2UB602T - Renewable Energy**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Name different types of solar cells. K1(2)
- 2) Explain anaerobic digestion and its benefits. K2(4)
- 3) Explain various battery charging methods. K2(6)
- 4) Discuss forces for extraction of energy from wind in Aerodynamics and analyse with phasor diagram representation of forces of a wind turbine. K3(9)
- 5) Discuss with neat sketch the major components to make use for vapor dominated geothermal power plant . K3(9)
- 6) Interpret between small, mini and micro hydro plants. Draw and explain the basic components of a hydro power plant with a layout arrangement. K5(10)
- 7) Illustrate the working principle and performance analysis of Ocean thermal energy conversion. Find the overall efficiency of an ocean thermal energy conversion power plant if the temperature of warm water in the surface layer is 30 degree C. and temperature of cold water in depth of tropical ocean is 8 degree C. It can be assumed that the relative efficiency factor EF of power plant is 0.5. K4(12)
- 8) Explain the working of horizontal axis wind turbine generator (HAWT) with suitable diagram. Estimate in case of a wind turbine, the forces on blades and torque. K5(15)
- 9) Explain the following angles with neat diagrams with respect to solar radiation analysis: a) Solar Azimuth angle b) Altitude angle c) Zenith angle d) Declination angle e) Hour angle K5(15)
- 10) Estimate the maximum power output, filling factor and efficiency of a solar cell with resistive load. Calculate filling factor, maximum power and cell efficiency with following parameters: $V_{oc}=0.24$ V, $I_{sc}=-10$ mA, $V_m=0.14$, $I_m=-6.5$ Ma, Intensity= 100 W/m², Area= 4 cm². K6(18)