

**School of Engineering****B.TECH Mechanical Engineering  
Semester End Examination - Jun 2024****Duration : 180 Minutes  
Max Marks : 100****Sem VI - G3UB607T - Renewable Energy Systems**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) List the economic benefits associated with Renewable Energy. K1(2)
- 2) Illustrate the conversion technologies used to produce energy from biomass. K2(4)
- 3) Demonstrate the process of thermal heating in solar cooker. K2(6)
- 4) A single solar cell (10 cm x 10 cm) produces a voltage of 0.5 V and a current up to 2.5 A. If the solar insolation is 800 W/m<sup>2</sup>, the efficiency of the solar cell is? K3(9)
- 5) Describe the operation of a Wave Energy Converter and its applications. K3(9)
- 6) Justify the role of algae in producing Biofuels. K5(10)
- 7) Analyze the advancements in Wind Turbine technology for increased efficiency. K4(12)
- 8) Evaluate the efficiency of Solar PV systems in grid-connected setups. K5(15)
- 9) A wind turbine travels with the speed is 10 m/s and has a blade length of 20 m. Determine wind power. K5(15)
- 10) A house has the following electrical appliance usage: One 18 Watt fluorescent lamp with electronic ballast used 4 hours per day. One 60 Watt fan used for 2 hours per day. One 75 Watt refrigerator that runs 24 hours per day with compressor run 12 hours and off 12 hours. The system will be powered by 12 Vdc, 110 Wp PV module. Determine power consumption demands, Size the PV panel, Inverter sizing, Battery sizing and Solar charge controller sizing. K6(18)