

## School of Engineering

M.Tech Power System Engineering  
Semester End Examination - Jun 2024

Duration : 180 Minutes  
Max Marks : 100

### Sem II - G2PI204B - Power Electronics Applications in 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) Define an AC-DC-AC converter, and what is its role in distributed power generation systems? K1(2)
- 2) Explain how the bandgap of a semiconductor material influences the efficiency of a solar cell. K2(4)
- 3) Explain, how do wind farm accessories contribute to the overall performance and efficiency of wind turbines in a wind farm? K2(6)
- 4) Can you illustrate the operation of a parabolic trough solar collector used for solar thermal energy conversion? K3(9)
- 5) Can you illustrate the operation of a grid-tied wind energy system with power electronics for grid support services? K3(9)
- 6) Examine the significance of energy security and resilience in ensuring reliable energy supply. K5(10)
- 7) Analyze the impact of reactive power compensation provided by AC-DC-AC converters on grid stability and power quality. K4(12)
- 8) Examine the role of pitch control systems in regulating rotor blade angle for optimal energy capture. K5(15)
- 9) Examine the importance of interconnection techniques, such as series and parallel connections, in solar cell arrays. K5(15)
- 10) Elaborate on the concept of energy transition and its implications for global energy markets and geopolitics. K6(18)