

**Code No: 156DH****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, February/March - 2022****WIND AND SOLAR ENERGY SYSTEMS****(Electrical and Electronics Engineering)****Time: 3 hours****Max. Marks: 75**

**Answer any five questions**  
**All questions carry equal marks**

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- 1.a) Discuss about different configurations of wind turbines and their advantages and disadvantages.  
b) Discuss about the performance characteristics of wind turbines. [8+7]
- 2.a) Describe the main considerations in selecting a site for wind generators.  
b) Derive the expression for power developed due to wind. [8+7]
- 3.a) Explain Voltage and Frequency operating Limits of grid and their Impacts.  
b) Explain the operation of fixed and variable speed wind turbine. [7+8]
4. Explain the solar power generation in:  
a) Parabolic dish and  
b) Solar pond. [8+7]
- 5.a) Describe, what are the main elements of a PV system?  
b) What is solar energy? How solar energy is utilized in generation of electrical power? [7+8]
6. Discuss the Maximum Power Point Tracking (MPPT) algorithm used in solar photo voltaic systems. [15]
- 7.a) Explain extraterrestrial and terrestrial Radiation.  
b) Define the following:  
i) Declination  
ii) Altitude angle  
iii) Solar Constant. [6+9]
8. Explain the Operation of a wound field Synchronous Generator in a variable speed wind energy conversion scheme with control strategy based on 'speed cube law' to obtain optimal power output from the wind turbine. [15]

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