B.E. Electrical (Electronics & Power) Engineering (MODEL CURRICULUM) Sem-VI

TE201A : Wind and Solar Energy System

P. Pages : 2 **GUG/W/22/13870**

Time : Three Hours * 3 0 9 9 * Max. Marks : 80

Notes :
1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.
5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
6. Answer **any five** questions as per internal given choice.
7. Use of non programmable calculator is permitted.

1. a) Calculate the Tip Speed Ratio for a wind turbine having the rotor radius 25 m. the angular speed recoded is 600 rad/sec and the available wind speed is 620 m/s. **4**

b) Discuss the wind power statistics in India and global scenario. **4**

c) Explain the tip speed ratio for the wind turbine. **8**

OR

2. a) The speed of the wind available in the area is 18 m/s. wind turbine, has the rotor area of $8\,m^2$. If the density of the air is $2.23\,kg/m^3$, calculate the total power present in the wind? **8**

b) A wind turbine having the rotor area of $18\,m^2$. The speed of the wind available in the area is 23 m/s. If the density of the air is $2.57\,kg/m^3$, calculate the maximum power that can be extracted from the wind? **8**

3. a) A 65 Hz, 4 pole Induction machine is running at a slip of 0.36. Calculate (1) Speed of the motor (2) rotor current frequency. **8**

b) A 62 Hz, 8 pole Induction machine has a rotor current of frequency 3.25 Hz. Calculate (1) Slip (2) Speed of the motor. **8**

OR

4. a) Explain the construction and working of Induction Generator? **8**

b) Explain construction of doubly fed induction generator. **8**

5. a) Write short notes on solar radiation. **8**

b) Discuss different solar photovoltaic technologies in detail. **8**

OR

6.	a)	Write short notes on Power Electronic Converters for Solar Systems.	**8**
	b)	Write short notes on solar radiation.	**8**
7.	a)	What are the power quality issues in the interconnected systems of solar PV and wind.	**8**
	b)	Write short notes on Network Integration Issues.	**8**

OR

8.	a)	State the methods to resolve grid interface issues of wind power?	**8**
	b)	Explain wind solar hybrid system?	**8**
9.	a)	Explain the construction of solar thermal power plant.	**8**
	b)	What is solar pond? Explain the main applications of solar pond?	**8**

OR

10.	a)	Compare the following types of collectors.	**8**
		i) Flat plate ii) Paraboloidal	
		iii) Parabolic through	
	b)	What is the principle collection of solar energy used in a non-connective Solar pond?	**8**

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