Scheme - I

Sample Question Paper

Program Name : **Electrical Engineering Program Group**
Program Code : **EE/EP/EU/IS**
Semester : **Fifth**
Course Title : **Wind Power Technologies (Elective)**
Max. Marks : **70** **Time: 3 Hrs.**

22528

Instructions:
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any Five of the following. **10 Marks**

a) State the India's approximate position in wind power generation in the world.
b) Identify the capacity and tower type suitable for horizontal axis wind turbine
c) Name any two forces acting on wind turbine.
d) Name any two aerodynamic controls for WPPs.
e) Identify any two weekly maintenance activities for WPP.
f) Name the types of generators used in SWT.
g) State any two electronic components used in SWT.

Q.2 Attempt any Three of the following. **12 Marks**

a) Explain the specified characteristics of the wind related to wind power generation
b) Identify appropriate type of actuators for pitching and yawing control for horizontal WPP.
c) List various types of generators used in WPPs.
d) List the activities in the minor and major repairs in WPP.

Q.3 Attempt any Three of the following. **12 Marks**

a) Identify the site and wind characteristics suitable for vertical axis wind turbine.
b) Define cut-in and cut-out speed of WPP with neat labeled graph.
c) Explain the working of squirrel cage induction generator.
d) Describe with sketches the working of permanent magnet synchronous generator used in SWT.

Q.4 Attempt any Three of the following. 12 Marks

a) Explain the stall and pitch control for WPP.

b) Describe the general maintenance issues of the vertical axis WPP(s)

c) Explain with sketches any one type of tower used for SWT.

d) Describe the routine maintenance practices for electrical and electronic equipment used in SWT.

e) Identify the type of wind turbine which can be built without yaw mechanism. Explain detection of the wind direction in it.

Q.5 Attempt any Two of the following. 12 Marks

a) Justify the need, location and working of any three sensors used in WPPs

b) Identify and explain any two difficulties faced while connecting WPP to the grid.

c) Recommend and explain with sketch a suitable braking mechanism for the horizontal axis wind turbine.

Q.6 Attempt any Two of the following. 12 Marks

a) Plan the preventive maintenance schedule for the actuators and sensors.

b) Recommend with justification the devices for the following:

   i) increase the speed of SWT,

   ii) detect the direction of wind,

   iii) sense the temperature of the generator winding.

c) Identify and suggest remedies for any three electrical and any three mechanical faults in SWT.

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Program Code : **EE/EP/EU/IS**

Semester : **Fifth**

22528

Course Title : **Wind Power Technologies (Elective)**

Max. Marks : **20** **Time: 1 Hour.**

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Q.1 Attempt any FOUR. **08 Marks**

a. State the various types of wind power plants.

b. List two characteristics of wind related to WPP.

c. Compare geared drive and direct drive.(Any two point)

d. Suggest the sensors for sensing speed and direction of wind.

e. Select appropriate actuators for pitching and yawing mechanism.

f. Name two aerodynamic control mechanisms for WPP.

Q.2 Attempt any THREE. **12 Marks**

a. Compare horizontal axis and vertical axis wind turbine.

b. Explain with sketches the braking mechanism for large type wind turbine.

c. Identify the difficulties faced in connecting WPP to the grid.

d. Identify the situation for cable twisting and write its remedy.

e. Explain with neat sketch the working of the wound rotor induction generator.

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Q.1 Attempt any FOUR. **08 Marks**

a. State the types of maintenance for WPP.

b. List any two major repairs in large WPP.

c. State the types of SWT.

d. Compare direct drive and geared drive for SWT.

e. Compare permanent magnet synchronous generators and induction generators of SWT.

f. State the function of wind vane.

Q.2 Attempt any THREE. **12 Marks**

a. Identify the need for proper warranty and insurance clauses/conditions for WPP.

b. Identify and suggest maintenance for wear and tear in/of any two parts of the WPP.

c. Illustrate with neat sketch the two features of lattice tubular tower for SWT.

d. Identify the need and function of any two power electronics devices in SWT.

e. Identify two electrical and two mechanical faults in SWT. Write the remedies for the same.
