

22528

21222

**3 Hours / 70 Marks**

Seat No.

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15 minutes extra for each hour

- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE questions from given below :**

**5 × 2 = 10**

- (a) State the advantages of wind power for Generating Electricity (any four).
- (b) Define : (i) Cut in (ii) Cut out wind speed.
- (c) State the types of forces acting on wind turbine.
- (d) State the types of maintenance activities for wind power plant.
- (e) State the meaning of Aerodynamic control in wind power plants briefly.
- (f) State the classification of small wind turbines on any two points.
- (g) State the characteristics of wind energy required for wind power plant.

**2. Attempt any THREE questions from given below :**

**3 × 4 = 12**

- (a) State the important features of Horizontal axis wind power plants (Any four).
- (b) State the functions of rotor blades hub, tower, Electric generator of a wind power plant.
- (c) State the necessity of Braking mechanism for large wind power plants.
- (d) State the requirements and procedure of preventive maintenance of wind power plants.

**3. Attempt any THREE questions from given below : 3 × 4 = 12**

- (a) Justify the need and location of following type of sensors used in WPP's :
  - (i) Wind vane rpm sensor
  - (ii) Temperature sensor of nacelle
  - (iii) Vibration sensor
  - (iv) Cable untwisting sensors
- (b) With suitable sketch explain working of squirrel cage rotor Induction Generator.
- (c) State the working of Doubly fed Induction generator with suitable sketch.
- (d) State any four basic requirements for installation of small wind turbine.

**4. Attempt any THREE questions from given below : 3 × 4 = 12**

- (a) State the working of permanent magnet synchronous generators used for small wind turbines.
- (b) State any two types of small wind turbine towers with justification for each.
- (c) State any four mechanical faults in SWT that occurs in small wind turbines.
- (d) Draw the layout of wind power plant substation. State meaning of each block.
- (e) State the advantages of Direct Drive and semi-geared wind power plants (Any two).

**5. Attempt any TWO questions from given below : 2 × 6 = 12**

- (a) State any four problems and probable solutions while connecting wind power plant to the grid.
- (b) State the meaning of scheduled maintenance and unscheduled maintenance briefly and also list the maintenance activities covered under such category.
- (c) State the advantages and disadvantages of Lattice tubular type and Hydraulic towers (2-each).

**6. Attempt any TWO questions from given below :****2 × 6 = 12**

- (a) State the meaning of following terms :
- (i) Survival wind speed
  - (ii) Threshold wind speed
  - (iii) Rated power
  - (iv) Nominal power
  - (v) Drag
  - (vi) Lift
- (b) (i) Explain with neat sketch the blade rotation of given small wind turbine.
- (ii) State the functioning of
- (a) Gearbox
  - (b) Generator
  - (c) Anemometers
  - (d) Tail Vane
- (c) State the requirement of General maintenances. List such general maintenances activities (any 8).
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