22528

**12223**

**3 Hours / 70 Marks** Seat No. | | | | | | | | |

***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) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :** **10**

(a) List any four switchgears used in a WPP sub-station.

(b) List any four types of towers used in WPP.

(c) Define cut-in and cut-out wind speed. Give specific value of each.

(d) Name any two breaking mechanisms for large WPPs.

(e) Give any four objectives of maintenance of WPP.

(f) Mention any two minor repairs in case of SWT.

(g) State any two important factors related to blades used for SWT.

**2. Attempt any THREE of the following :** **12**

(a) Classify WPPs on any four points.

(b) Explain Yawing mechanism in wind turbine with neat sketch.

(c) List two advantages and two disadvantages each of DFIG used in WPP.

(d) Explain Drag and Lift rotation principle of WPP.

**3. Attempt any THREE of the following :** **12**

(a) State meaning of following characteristics of wind energy :

(i) Wind movement

(ii) Wind profile

(iii) Roughness

(iv) Obstacle in wind path

(b) State function and location of any four sensors used in large WPP.

(c) Explain aerodynamic control of WPP.

(d) Explain with neat sketch working of induction generator used in SWT.

**4. Attempt any THREE of the following :** **12**

(a) Explain about local impacts of electrical grid connection of WPP.

(b) Explain different areas of failures in WPP.

(c) Explain with block diagram working of direct drive type SWT.

(d) Explain preventive maintenance practices for electronic equipments used in SWT.

(e) Compare horizontal and vertical axis SWT on any four points.

**5. Attempt any TWO of the following :** **12**

(a) State function of following parts of WPP :

(i) tower (ii) nacelle (iii) hub

(iv) blades (v) gear box (vi) generator

(b) Compare SCIG and PMSG used in WPPs on the basis of cost, construction, speed control, reactive power control, output and application.

(c) List the activities in scheduled maintenance of active pitch controlled WPP.

**6. Attempt any TWO of the following :** **12**

(a) Plan the preventive maintenance schedule for the following actuators :

(i) Yaw control

(ii) Pitch control

(b) Related to SWT :

(i) Explain function of tale vane and wind vane.

(ii) Name sensors for temperature and rpm.

(iii) Give types of generators to give constant speed.

(c) List any three common mechanical and any three common electrical faults in SWT. Suggest type of maintenance for each.