22528

12425

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) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

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

Marks

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

(a) Write any four factors governing the site selection of wind power plant.

(b) State different types of towers used in wind power plant.

(c) List the various types of sensors used in wind power plant. (Any 4)

(d) State the classification of electrical generators used in wind power plants.

(e) List the unscheduled maintenance of Large Wind Power plants.

(f) State the classification of small wind Turbines (SWTs).

(g) Discuss common electrical faults occurred in small wind turbines.

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

(a) Explain the specified characteristics of wind related to wind power plants.

(b) Prepare the list of various parts of a wind power plant and write the functions of any four major parts.

(c) Define the following terms related to wind power station :

(i) Tip Speed ratio

(ii) Yaw Control

(iii) Pitch angle

(iv) Pitch control

(d) Write any eight common causes for failuare of wind power plant.

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

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

(b) Discuss with neat sketch of hydraulic wind turbine and hydraulic multi turbine arrangement system.

(c) Draw block diagram and explain electric grid connection of wind farms.

(d) Distinguish between upwind and downwind small wind power plant on the basis of :

(i) Weight of structure

(ii) Rotor Position

(iii) Fatigue load on turbines

(iv) Drop in wind

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

(a) Distinguish between Doubly fed induction generator and permanent magnet synchronous generator on the basis of : Active and reactive power control, Electrical losses, Mechanical stress and energy yield.

(b) Discuss any four procedural tasks and benefits of preventive maintenance.

(c) Explain with neat sketch of doubly fed variables speed induction generator.

(d) Discuss step by step procedure for installation work of small wind power plant.

(e) Classify the wind power plant according to speed and write any four advantages of PMSG.

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

(a) Draw a curve of typical wind turbine output power with steady wind speed and explain cut in wind speed, cut out speed, power curve and survival speed.

(b) Explain with neat sketches, breaking mechanisms of furling, Yawing and pitch control of large wind power plants.

(c) Draw the block diagram of squirrel cage induction generator and write any four benefits and drawbacks of SGIG.

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

(a) Explain Preventive Maintenance ? Write a note on procedural tasks and benefits of preventive maintenance.

(b) Explain various power electronic devices used in small wind power plant.

(c) (i) Compare fixed speed and variable speed wind turbines on the basis of generators used, speed during operation and aerodynamic performance.

(ii) Block diagram shows variable speed wound rotor synchronous generator. Give the correct names of different parts in the given figure :