

Scheme – I

Sample Question Paper

Program Name : Diploma in Industrial Electronics
Program Code : IE
Semester : Fifth
Course Title : Power Electronics in Wind and Solar Systems
Max. Marks : 70

22540

Time : 3 Hrs.

Instructions:

- (1) All questions are compulsory.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data if necessary.
 - (5) Preferably, write the answers in sequential order
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Q.1 Attempt any FIVE of the following.

10 Marks

- a. Describe the working of horizontal axis wind turbine.
- b. List any two advantages & disadvantages of vertical axis wind turbine.
- c. State the principle of solar PV system.
- d. State the working principle of wind power plant.
- e. Write four Safety precautions while doing battery maintenance.
- f. List the power electronics devices used in solar PV systems.
- g. Define: i) Cut-in speed. ii) Yaw control.

Q.2 Attempt any Three of the following.

12 Marks

- a. Draw the schematic diagram of standalone solar PV system. Describe the function of main components used in it.
- b. Describe the features of the IGBT used in small wind turbines.
- c. Describe the working of the charge controller used in solar PV system.
- d. Explain the factors which affect functional reliability of wind power system.

Q.3) Attempt any Three of the following.

12 Marks

- a. Classify following four activity in the given Solar System preventive Maintenance
 - i) Solar panel maintenance
 - ii) battery inspection
 - iii) battery cleaning,
 - iv) charge controller checking in given below schedulea) daily b) weekly c) monthly d) 3month
- b. Differentiate Geared wind power plants with direct-drive wind power plants.

- c. Describe the working principle of back-to-back converter in wind power plants.
- d. Compare flat plate collectors with concentrating collectors.

Q.4) Attempt any Three of the following.

12 Marks

- a. Compare horizontal axis wind turbine with vertical axis wind turbine with respect to
 - i) output power ii) starting iii) efficiency iv) generator and gear box.
- b. Explain the limitations in the operation of matrix converter.
- c. Describe the grid connecting issues with respect to grid integrated solar system.
- d. Describe the importance of maximum power point tracking in the operation of a photovoltaic system.
- e. Describe the functions of components used in solar powered street light system.

Q.5) Attempt any Two of the following.

12 Marks

- a. Explain the main considerations in selecting a site for wind power plant.
- b. Explain the process of checking the electrolyte specific gravity for a "Deep Cycle Flooded" Lead Acid battery.
- c. Explain pitch angle control, why it is used in Wind energy conversion system.

Q.6) Attempt any Two of the following.

12 Marks

- a.
 - i) Explain the necessity of the signal conditioner in a solar PV system.
 - ii) Compare solar energy collector on the basis of construction and area of application.
- b. Describe all the factors to be considered for the selection of inverter and batteries for solar energy conversion.
- c. Compare preventive maintenance with reliability centered maintenance.

Scheme – I

Sample Test Paper - I

Program Name : Diploma in Industrial Electronics
Program Code : IE
Semester : Fifth
Course Title : Power Electronics in Wind and Solar Systems
Marks : 20

22540

Time: 1 hour

Instructions:

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

Q.1 Attempt any FOUR.

08 Marks

- a. State advantages of horizontal axis wind turbine
- b. List the different parts of horizontal axis wind turbine
- c. Draw the basic block diagram of Wind energy conversion system.
- d. Write the advantages of using Induction generator in Wind energy conversion system
- e. List out the factors consideration for wind power plant site selection.
- f. Define the following with respect to wind energy conversion system
 - i) Cut-in speed
 - ii) Cut-out speed

Q.2 Attempt any THREE.

12 Marks

- a. Explain the aerodynamic braking of the wind turbine
- b. Explain Flow Diagram of a Wind Turbine System
- c. Describe with sketch working principle of Matrix Converter used in wind power plant.
- d. Describe the working of the soft starter used in the horizontal axis wind power plant
- e. Explain the stand alone operation of variable speed wind energy conversion system
- f. Write principle of operation of PWM inverter, describe how PWM inverter used for wind energy conversion.

Scheme – I

Sample Test Paper - II

Program Name : Diploma in Industrial Electronics
Program Code : IE
Semester : Fifth
Course Title : Power Electronics in Wind and Solar Systems
Marks : 20

22540

Time: 1 hour

Instructions:

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

Q.1 Attempt any FOUR.

08 Marks

- a. Differentiate between Flat plate collectors and concentrating collectors
- b. Define buck–boost converter
- c. List four Safety precautions while doing battery maintenance
- d. List advantages and disadvantages at photovoltaic solar energy conversion
- e. Draw the block diagram of solar photovoltaic system
- f. List the advantages of boost and buck-boost converter
- g. Write the advantages and disadvantages of solar powered straight light system.

Q.2 Attempt any THREE.

12 Marks

- a. Describe the grid connecting issues with respect to grid integrated solar system
- b. With the help of neat diagrams explain the operation of wind- solar PV hybrid system
- c. Illustrate the working of the system meter used for Solar PV System with its typical specification.
- d. Give the merits and demerits of MPPT.
- e. Write the steps for Solar Panel Maintenance
- f. Write a short note on Battery Maintenance in Solar pv System.