Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 64031

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Elective

Power Systems Engineering

PS 7004 — SOLAR AND ENERGY STORAGE SYSTEMS

(Common to M.E. Power Electronics and Drives and M.E. Electrical Drives and Embedded Control)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are types semiconductor materials used in solar cell?
2. Why the hot-spot heating occurs in PV cell?
3. What are the requirements of battery system for long term storage?
4. What is the role of blocking diode in solar module?
5. Write some names of international PV programs.
6. What are the requirements of inverter for grid connected PV system?
7. Name some solar thermal energy storage systems?
8. What are the factors affect the choice of battery type?
9. Give some direct drive applications of PV system.
10. Draw the block diagram for PV system application in solar car.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the characteristics of sunlight in detail. (8)

(ii) Discuss the electrical characteristics of semiconductors used in PV cell. (8)

Or

(b) (i) Draw the cross section of a typical solar cell and describe how it works. (8)

(ii) Outline the important aspects of PV cell interconnection. (8)

12. (a) What are the types of energy storage systems available, explain their features, suitability and applications. (16)

Or

(b) Explain the components of power conditioning in PV system and also explain various regulators. (16)

13. (a) Explain the features of various components of PV system in buildings and also explain the design issues for central power stations. (16)

Or

(b) Explain the safety and economic aspects of grid connected PV system in detail and also discuss the efficiency and performance factors of PV system. (16)

14. (a) Discuss in detail the impacts of intermittent generation in the context of cycling and emission. (16)

Or

(b) Explain the components and principle operation of pumped hydroelectric storage system in detail with neat sketch. (16)

15. (a) Explain the application of PV system in water pumping and battery chargers with neat component blocks (16)

Or

(b) Write notes on applications of PV system in,

(i) Space (8)

(ii) Telecommunications. (8)

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