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Question Paper Code: 52953

M.E. DEGREE EXAMINATION, DECEMBER 2015

Elective

Power Electronics and Drives

15PPE510 - SOLAR AND ENERGY STORAGE SYSTEM

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The word photovoltaic comes from words meaning:
 - (a) wind energy
 - (b) brightness
 - (c) light and electricity
 - (d) picture which moves

2. A PV module is:
 - (a) dozens of photovoltaic cells connected together
 - (b) wired in series
 - (c) wired in parallel
 - (d) all the above

3. Solar PV systems can be:
 - (a) connected to the power grid
 - (b) used to sell power to the grid
 - (c) a standalone source of electricity
 - (d) all the above

4. In the shade:
 - (a) less light strikes the PV cells
 - (b) less current is generated in PV cells
 - (c) the PV cell is cooler
 - (d) all the above

5. The maximum theoretical efficiencies of solar cells could be around
 - (a) 99%
 - (b) 60%
 - (c) 48%
 - (d) 1%
6. A pyrheliometer is an instrument used to measure the
 - (a) temperature of solar photovoltaic cell
 - (b) intensity of direct solar radiation at normal incidence
 - (c) intensity of indirect solar radiation
 - (d) efficiency of a solar photovoltaic cell
7. Solar energy cannot be stored in which of the following medium?
 - (a) water
 - (b) iron
 - (c) gas
 - (d) wood
8. The major disadvantage of energy storage in electrical system is
 - (a) lack of availability
 - (b) large area requirement
 - (c) high cost
 - (d) none of the above
9. Which of the following system is an application of solar thermal energy?
 - (a) Internal combustion engine
 - (b) Biogas generation
 - (c) Solar water heating
 - (d) Solar lighting
10. Which of the following solar energy devices is designed to reflect & concentrate energy from sunlight?
 - (a) Solar cooker
 - (b) Solar cell
 - (c) Solar water heater
 - (d) Solar concentrator

PART - B (5 x 2 = 10 Marks)

11. List out the advantages of solar system.
12. What is sizing in standard PV system?
13. Specify the importance of safety measures in grid connected PV systems.
14. What is energy storage systems?
15. Mention the practical difficulties for using solar car.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain briefly with the suitable diagram for characteristics of sunlight. Also discuss the arrangement and behavior of solar cells. (16)

Or

- (b) Explain the following:
- (i) Solar cell properties (8)
 - (ii) PV cell interconnection. (8)
17. (a) Explain briefly with the suitable diagram for solar modules. Also discuss the power conditioning and regulation of it. (16)

Or

- (b) How to protect the solar panels against the internal and external causes? And also analyze the designing procedure for standalone PV system. (16)
18. (a) What are the designing issues for central power station in grid connected PV systems? Explain it. Also compare the economic aspects of grid connected solar system with any other non-renewable sources. (16)

Or

- (b) Explain briefly the efficiency and performance of PV systems with grid. Also specify the international PV programs. (16)
19. (a) Explain the following:
- (i) Impact of intermittent generation (8)
 - (ii) Battery energy storage. (8)

Or

- (b) What is pumped hydroelectric energy storage? Explain it. (16)
20. (a) How to utilize the solar power for pumping the water? Explain it. (16)

Or

- (b) Explain briefly the applications of solar power in space and telecommunications with the relevant diagrams. (16)
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