

20-12-19
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Question Paper Code : 71067

M.E./M.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Elective

Electrical Drives and Embedded Control

PS 5092 – SOLAR AND ENERGY STORAGE SYSTEMS

(Common to M.E. Power Electronics and Drives/M.E. Power Systems

Engineering)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Write the characteristics of solar PV cells.
2. What is meant by PV cell interconnection ?
3. Write the functional operation of a bypass diode ?
4. What is a solar charge controller ?
5. What are the limitations of grid connected PV systems ?
6. What are the various forms of building-integrated PV systems ?
7. With examples, briefly explain the difference between intermittent and variable power sources.
8. What is the significance in pumped hydroelectric energy storage system ?
9. Write the basic working principle of a solar vehicle.
10. What is meant by radiation hardening ?

PART – B

(5×13=65 Marks)

11. a) What is a P-N junction ? Explain the characteristics of P-N junctions. (13)

(OR)

- b) What are solar cells ? What are their types ? Compare and contrast their properties in detail. (13)



12. a) Discuss the following in detail : (1) Solar PV conditioning and regulation
(2) Solar PV protection methods. (13)

(OR)

- b) What is a sizing curve ? How do you design a sizing curve for an isolated power system ? Explain in detail. (13)

13. a) Discuss the economic and safety aspects of a PV system in detail. (13)

(OR)

- b) Illustrate the design issues of a central PV power station. (13)

14. a) Discuss the working of a pumped hydroelectric energy storage system. (13)

(OR)

- b) Elaborate on the sensible heat storage systems. What are its advantages and disadvantages ? (13)

15. a) Explain the use of PV systems in telecommunications. Discuss about the design and performance optimization methods. (13)

(OR)

- b) How are PV systems useful in space ? What type of solar panels is used in space applications ? Give an overview of the space power conversion and energy storage methods. (13)

PART – C

(1×15=15 Marks)

16. a) Discuss the most common methods of storage of solar energy. What factors decide the choice of storage media ? On what factors the storage capacity depends on ? Explain.

(OR)

- b) Discuss about the future energy demands ? Discuss how the non-conventional forms of energy sources can be harvested for the arising needs with a special reference to solar power and its storage systems.
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