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Question Paper Code : 11226

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Elective

Embedded System Technologies

PS 4092 – RENEWABLE ENERGY AND GRID INTEGRATION

(Common to: M.E. Power Systems Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are grid codes and why it is important?
2. List the demerits of integrating renewable energy with grid.
3. Define photovoltaic effect.
4. Mention the difference between PV module and PV array.
5. Why braking is needed for wind energy system?
6. Define the term efficiency limit in wind.
7. List the demerits of tracking the PV panel using MPP.
8. Explain the principle behind MPPT tracking in wind energy system.
9. List any two energy storage system.
10. Mention the need for hybrid system.

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the impacts of renewable energy penetration to grid.

Or

- (b) Explain the significance of converters [boost & Buck & buck boost] in renewable energy system.

12. (a) Draw the equivalent circuit of PV cell and explain its characteristics with required sketch.

Or

- (b) Explain in detail the impact of insolation, temperature and shading effect on performance of PV system.

13. (a) Explain the operation and control of PMSG used in wind energy system with required sketch.

Or

- (b) Describe with the help of neat diagram the working of self excited induction generator in wind energy system.

14. (a) Draw and explain the flow chart of any one MPPT used in solar PV System.

Or

- (b) Illustrate the need for MPPT in wind energy system and explain any one MPPT in wind energy system.

15. (a) Explain the features of hybrid energy storage system.

Or

- (b) Explain in detail the coordinated operation of wind – PV hybrid system with suitable block diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Design a standalone PV system for your home. [Select load, PV sizing, Battery sizing, Days of autonomy of your own]. Draw the final sketch.

Or

- (b) Justify the requirements of selecting a boost, buck, buck boost converters in renewable energy system with suitable application scenario.