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

Question Paper Code : 11240

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

Elective

Power Electronics and Drives

PX 4005 — POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Betz limit.
2. Mention the different sources of Non-Conventional Energy.
3. Why Doubly fed induction machine is preferred for wind power generation?
4. What is the purpose of using Rotor side converter in doubly fed induction machine?
5. Does the performance of PV cell get better or worse when the temperature is higher?
6. What is Buck-Boost Converter?
7. Define Matrix converter.
8. State the advantages of PMSG.
9. Define the term Maximum power point tracking.
10. List out the major components employed in a grid connected pv system.

PART B — (5 × 13 = 65 marks)

11. (a) Write short notes on Pyrolysis, Gasification, Anaerobic decomposition.

Or

(b) Explain about Environmental impacts of Wind power and Solar power.

12. (a) With diagram, Explain the construction of rotor mechanism in Permanent magnet Synchronous machine.

Or

(b) With diagram. Explain the construction of Squirrel cage Induction generator.

13. (a) Develop the single diode Equivalent circuit model of the photovoltaic cell with all its necessary parameters.

Or

(b) With block diagram, explain the components of a basic stand-alone Pv system.

14. (a) Develop a Matrix converter topology based stand-alone wind turbine generator system model and explain all its components.

Or

(b) Develop a grid integrated PMSG based wind energy conversion system model and explain all its components.

15. (a) Explain the effect of shunt resistance and temperature in I-V characteristics of a solar cell.

Or

(b) Explain the typical components of a grid-connected hybrid biomass and diesel power generation system.

PART C — (1 × 15 = 15 marks)

16. (a) Develop and interpret the grid connected wind energy conversion system and photovoltaic system-based hybrid power generation scheme.

Or

(b) Develop the flowchart and explain the Incremental conductance method of maximum power point tracking for buck converter-based stand-alone PV system.