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**Question Paper Code: 92051**

M.E. DEGREE EXAMINATION, DECEMBER 2013.

Elective

Power Electronics and Drives

01PPE501 - POWER ELECTRONICS FOR PV AND WIND ENERGY SYSTEMS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. What are the merits and demerits of non-conventional energy sources?
2. What is meant by greenhouse gas effects?
3. What are the performance measures of solar PV systems?
4. What is MPPT?
5. Draw the block diagram of hybrid PV system.
6. Classify grid tied inverters.
7. Draw the characteristics of wind turbine.
8. What are the types of wind power systems?
9. Draw the schematic of the control circuitry for wind energy conversion system.
10. How many sensors are used while implementing P & O MPPT algorithm for PV systems?

PART - B (5 x 14 = 70 Marks)

11. (a) Give a detailed overview of today's world energy scenario with necessary charts.

(14)

Or

- (b) Explain with statistical data, how India is suitable for implementing new solar and wind power plants. (14)
12. (a) Explain the working operation of solar PV cell. Discuss the advancements in solar cell materials to improve the efficiency. Also compare different types of solar cells. (14)

Or

- (b) Explain the principle of PV fed water pumping system. Compare DC and AC PV water pumping systems with suitable examples. (14)
13. (a) Discuss the power control of grid connected inverters with necessary diagrams and characteristics. (14)

Or

- (b) Explain the working concept of grid connected PV systems. Also discuss the technical issues of the same. Mention IEEE standards for grid interactive PV system. (14)
14. (a) Explain the operation of PMSG in detail. Compare its merits and demerits with other wind generators. (14)

Or

- (b) What are the components of standalone wind energy conversion system? Explain the working of each element. (14)
15. (a) Draw the battery control circuitry for standalone PV system. How MPPT system influences on battery charging and discharging characteristics? (14)

Or

- (b) Explain the microcontroller based MPPT controller for wind energy conversion system. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) Design a 1 kW standalone PV system with MPPT. Assume Indian climatic conditions. (10)

Or

- (b) Briefly discuss about the hybrid off-shore wind energy systems. (10)