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Question Paper Code : 91474

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Eighth Semester
Electrical and Electronics Engineering
EE 6009 – POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is called greenhouse gas effect ?
2. How Fuel Cell is treated as renewable energy source ?
3. Why Permanent Magnet Synchronous Generators are preferred for low speed wind applications ?
4. Distinguish between Squirrel Cage Induction Generator and Doubly fed Induction Generator.
5. What is the need for Buck-Boost converter for solar photovoltaic system ?
6. Write the special requirements of Grid Interactive inverters.
7. What are the technical issues to be considered for grid integration of wind energy conversion ?
8. How grid integrated system for solar PV differs from wind energy system ?
9. What is the need for hybrid energy system ?
10. What is called Maximum Power Point Tracking ?

PART – B (5×13=65 Marks)

11. a) Explain the necessity for use of renewable energy sources and how renewable energy based power generation saves the environment ?

(OR)

b) Discuss the current status of biomass based renewable energy technologies and solar photovoltaic technologies.

12. a) Analyze the dynamic behavior of permanent magnet synchronous generator with respect to wind power variations.

(OR)

b) Draw the basic structure of Squirrel Cage Induction Generator and explain its operation. Also discuss its characteristics and uses.

13. a) Draw the power circuit of Boost converter used for solar Photovoltaic system and explain the operation for changing the DC voltage from one level to another level.

(OR)

b) Draw the power circuit for three phase PWM inverter used for wind energy conversion system and explain its operation.

14. a) Give a block diagram of photovoltaic conversion system which is designed to supply power to stand lone load. Describe the operation of main components used in it.

(OR)

b) With a functional block diagram, describe the functions of main components used in grid connected permanent magnet synchronous generator based wind energy conversion system.

15. a) Explain the various configuration of hybrid energy systems. Write down the merits and demerits of the different configurations.

(OR)

b) Write the commonly used Maximum Power Point Tracking (MPPT) algorithms for solar PV system. With the help of flow chart, explain perturb and observe MPPT algorithm.

PART – C (1×15=15 Marks)

16. a) Develop a block diagram of hybrid PV system which should be able to supply the power to the load for 24 hours without interruption. It should be using solar radiation, diesel and wind as the source of energy.

(OR)

b) A DC fan of 24 W needs to be run on solar PV during day time only. What should be the capacity of PV panel and power converter used in it ? Draw the power circuit configuration. List down all the possible design issues related to this arrangement.

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