

**M.E DEGREE EXAMINATIONS: NOV/DEC 2014**

(Regulation 2013)

Third Semester

**POWER ELECTRONICS AND DRIVES**

P13PETE18: Renewable Energy Resources

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

1. List the four vital factors for improving social benefit from energy.
2. Categorize the three control options available in technical implications of renewable energy systems with an example.
3. Define tilt factor for reflected radiation.
4. Draw the V-I characteristics of solar cell and define fill factor. What is the significance of fill factor?
5. Enumerate the major factors that have led to an accelerated development of wind power.
6. Define Weibull probability distribution function 'h' and sketch figure for scale parameter  $c=10$  and shape parameter  $k= 1, 2, \text{ and } 3$ .
7. Discuss about single ebb cycle system.
8. What do you understand by biofouling? How is the problem handled?
9. Discuss various conversion technologies of hydrogen to useful applications.
10. Examine the need of magneto hydrodynamic power conversion.

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**Q.No:11 is Compulsory**

11. Wind at 1 standard atmospheric pressure and  $15^{\circ}\text{C}$  has velocity of 15m/s. calculate:
  - (i) The total power density in the wind stream
  - (ii) The maximum obtainable power density
  - (iii) A reasonably obtainable power density

- (iv) The total power , and
- (v) The torque and axial thrusts.

GIVEN: turbine diameter =120m, turbine operating speed= 40 r.p.m at maximum efficiency. Propeller type wind turbine is considered.

- 12. (i) Discuss in detail about energy and sustainable development. (8)
- (ii) Estimate the Technical implications in renewable energy. (8)
- 13. (i) Discuss in detail about cell mismatch in a solar module and what are its implications? (6)
- (ii) Describe the classification of solar cells based on the type of active material used. (10)
- 14. (i) Derive an expression for power extraction from wind. (8)
- (ii) With the help of diagram, explain the nature of variation of wind speed with height (8) from the ground. Also explain the major applications of wind power
- 15. (i) Explain in detail about social and environmental aspects of tidal range power (6)
- (ii) What is the basic principle of ocean thermal energy conversion (OTEC?) (10)
- 16. (i) Comment on the safety issues related to the use of hydrogen (6)
- (ii) Describe an MHD open cycle system. What are the main advantages and (10) disadvantages of an MHD power generation?

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