

**B.E., DEGREE EXAMINATIONS: MAY/JUNE 2013**

Eighth Semester

**MECHANICAL ENGINEERING**

MEC141: Renewable Energy Sources

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Solar energy is
  - a) Primary energy
  - b) Conserved energy
  - c) Secondary energy
  - d) Converted energy
2. Energy transformation always associated with
  - a) Control
  - b) Losses
  - c) Enthalpy
  - d) Benefits
3. Heat is \_\_\_\_\_Energy
  - a) Low grade
  - b) High grade
  - c) None of the above
  - d) Superior grade
4. Entropy is more during conversion of \_\_\_\_\_ to \_\_\_\_\_
  - a) Electricity to thermal
  - b) Electricity to mechanical
  - c) Mechanical to electricity
  - d) Thermal to electricity
5. Ratio of Energy fed back by the material to the energy received from the environment
  - a) Yield ratio
  - b) Energy ratio
  - c) Material ratio
  - d) Environment ratio
6. Net energy yield is zero-those requiring highest investment-thermal insulation
  - a) Secondary energy sources
  - b) Primary energy sources.
  - c) None of the above
  - d) Zero energy sources
7. The direct conversion of heat energy into electric energy is based on \_\_\_\_\_ effect
  - a) Thomson effect
  - b) Seebeck Thermoelectric
  - c) Peltier effect
  - d) Ohm effect
8. Pyrheliometer is used to measure \_\_\_\_\_ radiation
  - a) Beam
  - b) Global
  - c) Infra-red
  - d) Diffused
9. Biomass on the other hand is \_\_\_\_\_
  - a) Carbon –neutral
  - b) Co<sub>2</sub>
  - c) Butane
  - d) Methane

10. Fins are used in solar air heaters in order to \_\_\_\_\_ heat transfer and contact
- a) Increase
  - b) Decrease
  - c) Eliminate
  - d) None of the above

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

- 11. What is meant by energy cycle?
- 12. State the principle of see beck effect?
- 13. Define MHD?
- 14. What are the instruments available for solar radiation measurement?
- 15. Write the factors which determine the output of wind energy systems?
- 16. Define OTEC?
- 17. List the types of wind mill.
- 18. Write any two disadvantages of biogas plant?
- 19. List any three types of agricultural wastes?
- 20. List the advantages of solar cells.

**PART C (5 x 14 = 70 Marks)**

21. a) (i) Explain in detail about the scientific principles of renewable energy. (7)
- (ii) What are the technical implications of renewable energy resources? (7)

**(OR)**

- b) (i) Explain the types of concentrating collectors with a neat sketch? (8)
- (ii) Write the potential impacts of harnessing renewable energy sources? (6)

22. a) With neat sketches, explain the operation of different types of flat plate solar collectors?

**(OR)**

- b) What is the principle of solar photovoltaic power generation? Explain a basic PV system integrated with the utility grid, with necessary block diagrams.

23. a) With block diagrams, explain the operation of both open and closed type Ocean Thermal energy conversion (OTEC) technology.

**(OR)**

- b) (i) Explain in detail about the design aspects of horizontal axis windmill. (10)
- (ii) List out the merits and de merits of geothermal power plant? (4)

24. a) (i) Describe the factors affecting generation of biogas in a digester. (7)  
(ii) Explain various biomass energy conversion methods. (7)

**(OR)**

- b) Explain about the biomass gasification plant with neat diagram.

25. a) Explain the operation of MHD (Magneto hydrodynamic power) generator with neat sketch. Also write its advantages and disadvantages.

**(OR)**

- b) (i) Describe in detailed about fuel cells with the suitable applications? (10)  
(ii) Give the Classifications of solar cells and state its applications? (4)

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