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Question Paper Code: 49706

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Elective

Mechanical Engineering

14UME906 - RENEWABLE SOURCES OF ENERGY

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Terrestrial radiation has a wavelength in the range of:
 - (a) $0.2\mu\text{m}$ to $4\mu\text{m}$
 - (b) $0.2\mu\text{m}$ to $0.5\mu\text{m}$
 - (c) $0.380\mu\text{m}$ to $0.760\mu\text{m}$
 - (d) 0.29μ to $2.3\mu\text{m}$
2. A cylindrical parabolic concentrator requires:
 - (a) 2-axes tracking
 - (b) 1-axis tracking
 - (c) no tracking
 - (d) seasonal adjustment only
3. A solar cell is basically:
 - (a) a voltage source, controlled by flux of radiation
 - (b) current source, controlled by flux of radiation
 - (c) an uncontrolled current source
 - (d) an uncontrolled voltage source
4. At present the share of hydro power in the country's total generated units is around
 - (a) 20%
 - (b) 25%
 - (c) 30%
 - (d) 35%

5. Ratio of maximum demand to connected load is termed as
- (a) Load factor (b) Power factor
(c) Demand factor (d) Form factor
6. The objective of energy management is
- (a) To minimize energy costs (b) To minimize environmental effects
(c) Both (a) and (b) (d) None of these
7. A mass balance for energy conservation does not consider which of the following
- (a) steam (b) water (c) raw materials (d) lubricating oil
8. Biomass is predominantly:
- (a) hydrogen (b) carbon monoxide (c) carbon dioxide (d) methane
9. The quantity of heat required to raise 1 kg of a substance by 1°C is known as
- (a) sensible heat (b) specific heat (c) latent heat (d) calorie
10. Specific energy Consumption can be expressed in which of the following units.
- (a) Tone/Kwh (b) KCal/Kg (c) Kcal/Kwh (d) None of these

PART - B (5 x 2 = 10 Marks)

11. Give three types of solar energy collectors.
12. What is the type of generator used in wind power plant?
13. Write any two items used as biomass fuels.
14. Compare floating drum with fixed dome.
15. List out different methods of energy storage.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the depletion process of solar radiation as it passes through the atmosphere to reach at the surface of the earth. (08)
- (ii) Describe the flat plate collector with the help of a suitable diagram. (08)
- Or
- (b) With the help of schematic diagram and briefly explain the working of solar thermal water pump. (16)

17. (a) Discuss and explain the horizontal wind mills with neat sketch. (16)

Or

(b) With the help of a diagram indicate the circulation of global winds. What are the forces responsible for determining the speed and direction of global winds? (16)

18. (a) (i) Write about energy from biomass. (8)

(ii) Explain the process of commercial production of ethanol from biomass. (8)

Or

(b) (i) What are the factors affecting the performance of biogas digester? (8)

(ii) Explain different types of bio-fuels. (8)

19. (a) What are the main types of OTEC power plants? Describe their working in brief. (16)

Or

(b) What types of sites are considered suitable for wave power development?. (16)

20. (a) Explain the construction and working principle of fuel cell with neat sketch. (16)

Or

(b) Explain the performance characteristics of battery and its equivalent circuit. (16)
