

CS/B.Tech/TT/APM/SEM-8/TT-801/2013

2013

ENERGY SCIENCE

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Objective Choice Type Questions)

1. Answer the following questions. 10X1 = 10
- A) Choose the correct alternatives for the following :
- i) The value of solar constant is
 - a) 3750 watt / m²
 - b) 1353 watt / m²
 - c) 6.62×10^{-27} erg-sec
 - d) none of these.
 - ii) Albedo is an effect related to
 - a) Atmospheric diffusion of heat
 - b) Atmospheric absorption of heat
 - c) Earth's emission of incident sun's energy
 - d) None of these.
 - iii) 'Barn' is an unit used for
 - a) measuring radioactivity
 - b) measuring radioactive decay
 - c) measuring microscopic nuclear cross-section
 - d) measuring wind power density.
 - iv) Octane number is associated with
 - a) Diesel fuel

- b) Petrol fuel
 - c) Methanol
 - d) Aviation fuel.
- v) Which of the following lamps use mercury inside it ?
- a) Incandescent lamps
 - b) Sodium vapour lamps
 - c) CFL lamps
 - d) LED lamps.
- vi) Which of the following varieties of coal has most superior quality ?
- a) Peat
 - b) Bituminous
 - c) Anthracite
 - d) Lignite.
- vii) Which isotope is used for cancer treatment ?
- a) U^{238}
 - b) Pu^{232}
 - c) Co^{60}
 - d) None of these.
- viii) Photovoltaics
- a) are solar battery or cells generating power
 - b) transform solar energy to connected circuit
 - c) are basically diode
 - d) conserve solar power
 - e) none of these.
- B) Write Brief answrs.
- ix) Define energy density of a fuel.
- x) Mention the name of the gas used as LPG.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Name some of the common applications of solar energy.
What are the limitations of using solar energy ?
3. Define wave energy. How is tidal energy utilized for conversion to electricity ? What do you know about Ocean Thermal Energy Conversion ?
4. What are the different forms of Renewable source of energy ? What is acid rain ? Explain in short about Global warming. What actions are to be taken to reduce it ?
5. What do you know about energy security ? What are the different forms of energy security ? What do you know about long and short term security ?
6. What is energy efficient motor ? Mention three methods which will assist to improve power factor. What do you mean by Maximum Demand Charge ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Discuss at least four practical techniques for reducing energy conservation in textile industry.
b) Discuss any two practical techniques of water conservation in textile industry and state how it is beneficial for energy saving. $8 + 7$
8. a) What are the different sources of geothermal energy ? Discuss about the mining of geothermal heat.
b) Mention about some of the important geothermal plants.
c) Discuss about the social and economic status of energy generation from geothermal heat. $7 + 5 + 3$

9. a) Discuss about how a wind farm generates electricity.

b) Discuss about the basic technology of converting wind energy to electrical energy and also mention the productive wind speed, wind speed for the optimal performance, blade speed of turbine.

c) Compare HAWT & VAWT. Mention the disadvantage of wind power. 3X5

10. a) Define energy audit. What is the need for energy audit ?

b) What are the factors on which the type energy audit to be performed is depend ? Classify energy audit and discuss about the primary energy audit methodology.

6 + 9

11. a) What are the basic principle of energy conservation ? In what respect energy conservation are beneficial to us ? Mention some of the energy conservations by control.

b) Mention some of the actions can be taken for energy conservation and mention salient feature of Energy Conservation (Amendment) Act, 2010 of India. 8 + 7

12. a) Give five production realization techniques relate to the energy conservation with its different mechanisms and effects used in textile industry.

b) What are the steps to be taken for thermal energy conservation in wet process in textile industry ? 7 + 8

13. Write short notes on the following : 5 3

a) Power factor

b) Carcinogenic emission

c) Thermal insulation in conservation

d) Biomass

e) **Tariff.**