

2015

M.Sc. Part-II Examination
ENVIRONMENTAL SCIENCE

PAPER—VIII

Full Marks : 100

Time : 4 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer Q. No. 1 and any five questions from the rest.

1. Answer any ten questions of the following : 10×2

- (i) Define 'Solar Constant' and write its value.
- (ii) What is the Chemical Composition of the Sun ?
- (iii) What do you mean by anaerobic digestion ?
- (iv) Highlights the trends in CO₂ emission intensities of India and Japan.

(Turn Over)

(v) The heat produced on complete combustion of 0.6g of LPG raise the temperature of 500g of water by 16°C . Calculate the calorific value of LPG.

(Sp. ht. of water = $4.2\text{ J/g}^{\circ}\text{C}$.)

(vi) How does carbon content of Coal is related to heat production ?

(vii) Mention two environmental impacts of OTEC.

(viii) What is the basic difference between fission and fusion.

(ix) How does the tidal energy converted into electrical energy ?

(x) How much Coal, natural gas O_2 Petroleum is required to generate 1 KWH of electricity ?

(xi) Write the principle of 'solar pond'.

(xii) What is 'pyrolysis' ?

(xiii) Write the working formula to estimate energy content of biofuel.

(xiv) What do you mean by 'radioactive waste management' ?

(xv) What is 'industrial ecology' ?

(xvi) Write two negative impacts of large hydroproject.

2. (a) Why is solar energy called 'environment friendly and independent' ?

(b) Write a brief note on : radiative zone of the Sun and photosphere of the Sun. 8+8

3. A nuclear reactor is developing energy at the rate of 3000 KW. How many atoms of U^{235} undergo fission per sec ? How much U^{235} would be used in 1000 hours of operation assuming that on an average energy of 200 Mev is released PCL fission. 8+8

4. Write the principle of generation of hydroelectricity. Give a sketch of hydroelectric power plant. What are the advantages of hydropower plants over thermal power plants. 8+3+5

5. (a) Give an outline on advantages and disadvantages of renewable, non-renewable and sustainable energy sources.

(b) Write the principle of production of electricity by OTEC method. 12+4

6. How are petroleum / natural gas formed ? What are the limits and alternatives of fossil fuels ? Mention some environmental issues related to fossil fuels. 3+8+5

7. What is wind Power ? Give the schematic design of wind turbine, write the working principle of wind turbine. 2+8+6
8. Mention one source for geothermal energy! Enumerats differences between dry steam power station and flush steam power station. Discuss the environmental impacts of geothermal power station. 2+8+6
9. (a) The poorer the country, the greater the reliance on traditional biomass resources'— comment on the statement. 6
- (b) Mention the stages of anaerobic digestion with block diagram. What are the benefits of using anaerobic digestion project. 6+4
10. Write notes on (any two): 8+8
- (a) Decommissioning of nuclear power reactor ;
- (b) Large scale exploitation of solar energy and its impacts ;
- (c) Large scale exploitation of wind energy and its impacts.