

2016

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) Write two negative impacts of large hydroproject.
- (ii) What are the important factors which affect the efficiency of PV-collectors ?
- (iii) Where is methane hydrate deposited ? How can it be used as a fuel ?

(Turn Over)

- (iv) 'All energy directly or indirectly originates from nuclear energy.'— Explain.
- (v) Mention two problems which are associated with the nuclear energy source.
- (vi) Define the unit 'Sievert' (Sv). Write the relation between 'Sv' and 'rem'.
- (vii) Write two physical effects of thermal pollution.
- (viii) Write four names of radiation monitoring devices.
- (ix) It has been common to use energy sources to generate electricity?— Why?
- (x) What are the impacts of global warming on water resources of the earth?
- (xi) What are the impacts of oil extraction, production and processing on the atmosphere of the earth?
- (xii) Illustrate by a figure the important interaction of energy systems with the environment.
- (xiii) Write the chemical equation with energy value where glucose is formed by photosynthesis.
- (xiv) Show a schematic flowchart for hydrolysis and fermentation of cellulose materials to ethanol.
- (xv) What is MHD power generator?
- (xvi) What is OTEC?

- 2. (a) Why is sunlight called earth's primary source of energy? 8+8
- (b) Write briefly on solar energy spectrum with graphical presentation. 8+8
- 3. (a) Compare the impacts on environment by the fossil fuels (coal, petroleum and natural gas).
- (b) Write a brief outline regarding formation of a coal and also write names of different types of coal. 8+8
- 4. What are the basic requirements for hydroelectric power generation? Write the major problems in the development of hydropower in India. Write a brief note on 'mini hydel generation.' 4+6+6
- 5. Give a general outline of ocean energy. How does tidal energy converted into electrical energy? What are the advantages and disadvantages of tidal energy? 7+4+5
- 6. Give a schematic diagram of a liqued flat plate collector with short description and function of its different components. What are the advantages and disadvantages of flat plate collector? 10+6

7. What are the resources of Geothermal energy? Narrate the senerio of geothermal energy use pattern in different parts of world. 4+12
8. (a) Write the principle of generating nuclear electricity. Why is nuclear fusion not used for producing electricity till date? (5+3)+8
- (b) Explain briefly the principle of operation of a nuclear reactor with schematic diagram. (5+3)+8
9. Define the 'time constant' related to the renewability of biomass. Give difference between renewable and non-renewable energy sources : also conventional and non-conventional energy sources with examples. Give a schematic diagram of a gasifier project for production of electric energy from biomass. 4+8+4
10. What are the characteristics of hazardous waste? Why is radioactive waste a hazardous waste? Give a brief outline of radioactive waste management and disposal. 6+2+8