(6 pages)

S.No. 6458 **P 22 ESE 1 A**

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

Environmental Science – Elective

ENERGY RESOURCES

Time : Three hours Maximum : 75 marks

SECTION A — (20 marks)

Answer ALL questions.

I. (A) Multiple choice questions : (5 × 1 = 5)

1. Which of the following use hydrogen as fuel?

   (a) Fossil fuels

   (b) Anaerobic digestion

   (c) Fuel cells

   (d) Cooking

2. 'Which two bands of solar radiation are the majority in the total solar radiation reaching Earth?

   (a) UV and visible

   (b) Visible and ultrasonic

   (c) Visible and infrared

   (d) Infrared and UV

3. Aquifers are distinguished into how many types are based on physical conditions under which water can exist in them.

   (a) 1 (b) 2

   (c) 3 (d) 4

4. Which of the following is a substrate for biogas production?

   (a) Municipal and residential waste

   (b) E-waste

   (c) Metallic waste

   (d) Gaseous effluents

5. The only country having a full-fledged ministry for the Development of New and Renewable Resources is ————.

(a) China (b) Bangladesh

(c) USA (d) India

(B) Fill in the blanks : (5 × 1 = 5)

6. India ranks ———— position on solar energy production.

7. Solar panels generate electricity by convening ———— into electrical energy.

8. India's position in the Global Wind Energy Council (GWEC) is ————.

9. Water table aquifer is also called ————.

10. The acetogenesis process involves the production of ———— as a product.

II. Answer these questions with one or two lines : (5 × 2 = 10)

11. Explain the Hubbert peak curve

12. What is a photovoltaic cell.

13. What is the principle of generation of hydroelectric power generation.

14. What is a microbial fuel cell.

15. Explain alternative sources of energy.

SECTION B — (5 × 5 = 25)

Answer ALL questions, choosing either (a) or (b).

16. (a) Describe in detail the status of the exploitation of coal.

Or

(b) Write in detail about energy production consequences on the environment.

17. (a) Differentiate the advantages and disadvantages of flat plate collectors.

Or

(b) Discuss the wind energy potential in India.

18. (a) Explain in detail the sources and procedures to obtain geothermal energy.

Or

(b) Describe in detail the geothermal prospects of energy in India.

19. (a) Explain the conversion process

(i) Pyrolysis and

(ii) Gasification.

Or

(b) Discuss the advantages and disadvantages of microbial fuel cells.

20. (a) Explain solar and wind energy usage patterns in India.

Or

(b) Discuss any two non-conventional energy resources and their impact on the environment.

SECTION C — (3 × 10 = 30)

Answer any THREE questions.

21. Explain the source, categories, and status of exploitation of coal and natural gas in the global scenario.

22. Explain the power generation potential of windmills and energy in India.

23. Discuss in detail geothermal energy prospects and problems.

24. Write short notes on types of biogas plains and their environmental constraints.

25. Differentiate between conventional and non-conventional energy resources.

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