

(6 pages)

Reg. No. : .....

Code No. : 8160

Sub. Code : VPHE 11

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2024.

First Semester

Physics — Elective – I

ENERGY PHYSICS

(For those who joined in July 2024 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. Nuclear power contributes only \_\_\_\_\_ of total electricity generation.  
(a) 15% (b) 5%  
(c) 25% (d) 10%
2. Solar cells when exposed to solar radiation give  
(a) Direct current (b) Alternating current  
(c) Voltage (d) None

3. What is the minimum temperature required for operating OTE power plants?  
(a) 50°C (b) 20°C  
(c) 10°C (d) 100°C
4. Which of the following statement is true for tidal energy?  
(a) It is conventional energy source  
(b) It generates due to alternating rise and fall of water level  
(c) It generates due to temperature difference of water in ocean  
(d) None of these
5. What is VAWT considering wind turbine?  
(a) Variable area wind turbine  
(b) Voltage ampere wind turbine  
(c) Vertical axis wind turbine  
(d) Variable axis wind turbine
6. If the speed of the wind stream remains unchanged, while passing through the rotor then  
(a) A large power is generated  
(b) Zero power is generated  
(c) The flow is known as stalled flow  
(d) The speed of the rotor is extremely high

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7. Which fuel is used in gas welding?  
 (a) LPG (b) Acetylene  
 (c) Methane (d) Ethylene
8. Main component of biogas is  
 (a) Propane (b) Butane  
 (c) Methane (d) Ethane
9. Output of solar cell is of the order of  
 (a) 1W (b) 5W  
 (c) 10W (d) 25W
10. The excess energy of active photons ( $h\nu - E_g$ ) also appears as  
 (a) light (b) electrons  
 (c) holes (d) heat
11. What is the total amount of incoming solar energy absorbed by the earth in one year?  
 (a)  $3.8 \times 10^{23}$  J (b)  $1.3 \times 10^{21}$  J  
 (c)  $7.5 \times 10^{20}$  J (d)  $3.8 \times 10^{24}$  J
12. An ideal OTEC plant should be kept less than about \_\_\_\_\_ from shore.  
 (a) 30 Km (b) 300 Km  
 (c) 300 m (d) 30 m

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13. In a charged cell, electrical energy is stored as \_\_\_\_\_  
 (a) wind (b) chemical  
 (c) thermal (d) nuclear
14. Anaerobic digestion requires a moisture content of atleast \_\_\_\_\_.  
 (a) 80 (b) 45  
 (c) 50 (d) 10
15. In a solar water heater, when water is heated its density \_\_\_\_\_  
 (a) decreases (b) increases  
 (c) not affected (d) expands

PART B — ( $5 \times 4 = 20$  marks)

Answer ALL questions, choosing either (a) or (b).  
 Each answer should not exceed 250 words.

16. (a) Explain nuclear energy.  
 Or  
 (b) Explain chemical energy.
17. (a) Write the basic principle of tidal power.  
 Or  
 (b) Explain the utilization tidal energy.

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18. (a) Explain the basic principle of wind energy conversion.

Or

- (b) Explain the power in the wind.

19. (a) Explain aerobic and anaerobic digestion.

Or

- (b) What are the advantages of anaerobic digestion?

20. (a) Write short note on solar cells.

Or

- (b) Explain the working of solar cooking.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

21. (a) Describe the different energy sources and their availability.

Or

- (b) Illustrate energy storage and distribution.

22. (a) Define the basic principle of tidal power and explain the utilization of tidal energy.

Or

- (b) Describe the principle and working of ocean thermal energy conversion systems.

23. (a) Describe the working of a wind energy conversion system with main components.

Or

- (b) Describe the main applications of wind energy, giving neat sketches.

24. (a) Explain the generation of bio gas from waste.

Or

- (b) Describe the different bio mas conversion technologies.

25. (a) Explain solar pond and its applications.

Or

- (b) Describe (i) solar cooking (ii) solar greenhouse.

