

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(6 Pages)

Reg. No:

Question. Code No: 25E01204

Sub Code: 24USPH22

UG Degree - End Semester Examinations, April 2025

Second Semester

B.Sc., PHYSICS

SEC - Energy Physics

(For those who joined in July 2024 onwards)

Time: 3 Hours

Maximum: 75 Marks

PART - A ($10 \times 1 = 10$ Marks)

Answer ALL Questions

Choose the correct answer:

1. Which energy source is renewable?

(a) Petroleum

(b) Coal

(c) Wind

(d) Natural gas

2. Which of the following energy source is abundant and free from greenhouse gas emissions?

- (a) Coal (b) Oil
(c) Diesel (d) Solar
3. The solar radiation entering the box-type solar cooker has _____ wavelength.
- (a) Short (b) Medium
(c) High (d) None of the above
4. Which of the following is a component of a solar water heater?
- (a) Gas burner (b) Reflector
(c) Flat plate collector (d) Heat exchanger coil
5. Which energy source is generated due to the gravitational pull of the moon and sun?
- (a) Solar energy (b) Tidal energy
(c) Geothermal energy (d) Wind energy
6. Which of the following is a common application of wind energy?
- (a) Automobile engines (b) Pumping of water
(c) Thermal power plants (d) Nuclear reactor
7. The process of converting biomass into gas using high temperature is called _____
- (a) Fermentation (b) Photosynthesis
(c) Combustion (d) Thermal gasification
8. Which of the following statement about methane is correct?

(a) It has a low calorific value (b) It has a zero calorific value

(c) It has a high calorific value (d) None of the above

9. Which of the following is a commonly used rechargeable battery?

(a) Lead-acid battery (b) Mercury cell

(c) Dry cell (d) Zinc-carbon cell

10. Which fuel cell is efficient, and the most highly developed cell?

(a) Oxygen Hydrogen (b) Hydrogen Nitrogen

(c) Oxygen Nitrogen (d) Hydrogen Oxygen

PART – B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) What are non-conventional energy sources? Explain.

(OR)

(b) Write a short note on Geothermal energy with a neat sketch.

12. (a) What is solar greenhouse? Explain its types.

(OR)

(b) What are the advantages and disadvantages of photovoltaic solar energy conversion system?

13. (a) Write a short note on the classification of the WEC system.

(OR)

(b) Discuss the advantages and disadvantages of WECS.

14. (a) Briefly describe the Deen Bandhu Biogas plant with a neat diagram.

(OR)

(b) List out the advantages of anaerobic digestion.

15. (a) Describe the construction and working of a nickel-cadmium battery.

(OR)

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

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

16. (a) Describe the world energy sources reserve and their availability.

(OR)

(b) Discuss merits and demerits of non-renewable energy sources.

17. (a) Explain the (i) natural circulation of the non-pressurized and (ii) forced circulation solar water heater.

(OR)

(b) Explain the applications, advantages and disadvantages of Photovoltaic solar energy systems.

18. (a) What are the basic components of a Wind Energy Conversion System (WECS)?
Briefly describe the function of each component.

(OR)

(b) Define tidal energy and explain the principle of tidal power generation with a suitable diagram.

19. (a) Explain the continuous and batch-type biogas plants in detail.

(OR)

(b) List and explain the (i) pH and (ii) Temperature factors affecting the biogas generation.

20. (a) Describe the construction and working of a lead-acid battery.

(OR)

- (b) What is a fuel cell? Explain the basic working principle of a fuel cell.