

The company has multiple production units spread across India and plans to install solar panels at its facilities to meet a significant portion of its energy needs. SolarTech also aims to market its solar-powered solutions to other businesses and consumers as part of its product portfolio. However, the company faces several challenges, including high initial capital expenditure, operational integration, and the intermittency of solar power.

Questions:

- (a) What are the key factors SolarTech Ltd. should consider when evaluating the long-term financial viability of adopting solar energy?
- (b) How can SolarTech effectively balance the challenges of energy intermittency and the need for consistent power supply in its operations?
- (c) What strategies should SolarTech adopt to stay competitive in the rapidly evolving solar energy market while ensuring cost-effectiveness?

MBEP 4004

M.B.A. DEGREE EXAMINATION, MAY 2026.

Fourth Semester

Common – Elective

RENEWABLE ENERGY

(2023 Regulation)

Time : Three hours

Maximum : 75 marks

PART A — (5 × 4 = 20 marks)

Answer any FIVE questions.

1. Distinguish between solar thermal and solar photovoltaic systems.
2. Summarize the global energy scenario and its implications for renewable energy.
3. Predict the role of biofuels in reducing greenhouse gas emissions.
4. Describe the process of hydrothermal liquefaction in bio-oil production.

5. Divide the components of a geothermal energy system and explain their functions.
6. Propose a design for a small-scale wind turbine suitable for rural electrification.
7. Rearrange the steps involved in bioelectricity generation using microbial fuel cells.
8. Criticize the challenges faced in integrating renewable energy into the national grid.

PART B — (5 × 8 = 40 marks)

Answer any FIVE questions

9. Classify different types of solar cells and explain their working principles.
10. Convert biomass into biofuels and describe the conversion processes involved.
11. Estimate the potential of wind energy in India and its contribution to the national grid.
12. Describe the operation of a geothermal power plant with a suitable diagram.
13. List the advantages and disadvantages of ocean energy systems.

14. Formulate a policy framework for promoting renewable energy adoption in rural areas.
15. Construct a comparative analysis of first, second, and third-generation solar cells.
16. Judge the feasibility of implementing a nationwide carbon credit system in India.

PART C — (1 × 15 = 15 marks)

17. Case Study (Compulsory)

SolarTech Ltd. is a leading manufacturer of solar panels and solar-powered solutions in India. The company has seen a rapid rise in demand for renewable energy products, driven by government policies, growing environmental awareness, and the push towards sustainable energy sources. As part of its strategy to expand its market share and meet corporate sustainability goals, SolarTech Ltd. has decided to adopt solar energy for its own operations, transitioning from conventional electricity sources to self-generated solar power.