

# 12244

**11122**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *compulsory*.
- (2) Answer each next main Question on a new page.
- (3) Illustrate your answers with neat sketches wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Assume suitable data, if necessary.
- (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) Solve any **THREE** of the following: **12**
- (i) Explain the need of alternate energy sources.
- (ii) Enlist major sources of energy.
- (iii) Design primary and secondary energy sources.
- (iv) Name four factors deciding final cost of electricity purchased by customer.

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- b) Solve any **ONE** of the following: 6
- (i) What is beam and diffuse solar radiation? State the meaning of sun angles.
  - (ii) Compare biomass with conventional fuels.
2. Solve any **FOUR** of the following: 16
- a) Describe the working of solar pump with neat sketch.
  - b) State the principle of solar energy conversion into electricity.
  - c) State the advantages of wind energy.
  - d) What do you understand by energy audit? What are its types?
  - e) Explain combined cycle system
  - f) State the ways of improving boiler efficiency.
3. Solve any **FOUR** of the following: 16
- a) What is the principle of wind energy conversion? State how power is to be developed?
  - b) Describe working of horizontal axis windmill and draw a labelled sketch.
  - c) What are the methods for obtaining energy from biomass. Explain any one.
  - d) Describe the working of fixed bed gasifier.
  - e) Explain the importance of energy conservation and management.

4. a) Solve any **THREE** of the following: 12
- (i) State the prospects of alternate energy sources.
  - (ii) State renewable and non-renewable energy sources with applications.
  - (iii) Explain the design principle of box type solar cooker with neat sketch.
  - (iv) Describe working of compound parabolic collector (CPC) with labelled sketch.
- b) Solve any **ONE** of the following: 6
- (i) What is a solar furnace? State the different configurations of it with sun tracking systems. State its applications.
  - (ii) State the advantages of horizontal and vertical axis wind mills.
5. Solve any **FOUR** of the following: 16
- a) Describe a basin type solar still for distillation of salt water to potable water.
  - b) State the main applications of wind energy for power generation and pumping.
  - c) What are the methods used for obtaining energy from biomass. State any one.
  - d) Explain the concept of ROI.
  - e) Explain what do you understand by cogeneration?
  - f) What is meant by energy management? Why it is necessary?

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**Marks**

**6. Solve any FOUR of the following:**

**16**

- a) Explain the concept of payback period.
  - b) Explain the principle of energy conversion.
  - c) What do you understand by recycling of waste.
  - d) Define thermal insulation. State the purpose of critical thickness.
  - e) What is meant by energy conservation in compressed air? Explain.
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