

17611

15116

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any THREE of the following:** **12**
- (i) Who are the members of OPEC? Explain the policies of OPEC.
 - (ii) State any four advantages and disadvantages of nuclear power plant.
 - (iii) Define:
 - 1) Declination Angle (δ)
 - 2) Solar Incidence Angle (θ)
 - (iv) Give classification of wind mills.

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- b) **Attempt any ONE of the following:** **6**
- (i) Explain with neat sketch natural circulation solar water heating system.
 - (ii) Explain co-generation process in sugar factory.
- 2. Attempt any FOUR of the following:** **16**
- a) Define:
 - (i) Solar Altitude Angle (∞)
 - (ii) Solar Zenith Angle ($\ominus z$)
 - b) State advantages and limitations of concentrating collectors over flat plate collectors.
 - c) Explain the factors considered for selection of suitable sites for wind mill power plants.
 - d) Explain the benefits of biomass as energy.
 - e) Explain working of economiser with neat sketch.
 - f) Explain biomasses and describe algae with its advantages.
- 3. Attempt any TWO of the following:** **16**
- a) State the need of alternate energy sources. What is the prospect of alternate energy sources in Indian context?
 - b) Explain the structure of Sun with neat sketch.
 - c) Define biomass. Enlist various methods for obtaining energy from biomass.

- 4. a) Attempt any THREE of the following:** **12**
- (i) What is photovoltaic material? Explain.
 - (ii) What is Magnus effect?
 - (iii) What is biodiesel? State any four applications.
 - (iv) Explain payback period. State its advantages and limitations.
- b) Attempt any ONE of the following:** **6**
- (i) Explain classification of hydroelectric power plants.
 - (ii) What is sankey diagram? Explain sankey diagram for boiler plant and furnace.
- 5. Attempt any FOUR of the following:** **16**
- a) What is the impact of cooling tower on environment?
 - b) What is acid rain? Explain.
 - c) Explain with neat sketch Solar Evacuated Tube Collector (ETC).
 - d) Explain the pitch control mechanism for wind turbine blade.
 - e) What are the advantages and disadvantages of fixed dome type biogas plant?
 - f) Classify various biomass conversion routes and explain anaerobic digestion.
- 6. Attempt any TWO of the following:** **16**
- a) Explain construction and working of winter green house and summer green house.
 - b) Draw basic structure of wind mill and explain its various components.
 - c) What is energy audit? Explain energy audit of boilers in detail.
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