

17611

16172

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) Solve any **THREE** of the following : **12**

- (a) Explain the need of renewable energy sources.
- (b) List four primary and four secondary energy sources.
- (c) What is OPEC ? Enlist all the countries of OPEC cartel.
- (d) Explain super capacitor.

(B) Solve any **ONE** of the following : **06**

- (a) What is beam and diffuse radiations ? Describe composition of solar radiations.
- (b) Describe transesterification process of biodiesel.

**2. Solve any FOUR of the following :****16**

- (a) Define the following :
  - (i) Declination
  - (ii) Hour angle
  - (iii) Altitude angle
  - (iv) Zenith angle
- (b) Describe with labelled sketch the parabolic trough collector.
- (c) Describe with neat sketch the working of heat pipe.
- (d) Explain the principle of wind energy conversion.
- (e) What do you understand by energy audit ? State its type.
- (f) State the ways of improving boiler efficiency.

**3. Solve any FOUR of the following :****16**

- (a) State the principle of operation of hydro-electric power plant.
- (b) Describe working of horizontal axis wind turbine and draw a labelled sketch.
- (c) What do you understand by energy plantation ? Give example.
- (d) Explain the process of Anaerobic digestion.
- (e) What is energy management ? Write four objectives of it.

4. (A) Solve any THREE of the following : 12

- (a) What is greenhouse effect and global warning ?
- (b) State the major sources of renewable energy and explain any one.
- (c) Describe the working of SPV pumping system with neat sketch.
- (d) State the points to be considered in locating the site of hydro power plant (any 4 points).

(B) Solve any ONE of the following : 06

- (a) Explain construction and working of hydroelectric power plant.
- (b) Explain construction and working of photovoltaic electric conversion.

5. Solve any FOUR of the following : 16

- (a) What is thermo chemical conversion of biomass ? State the methods.
- (b) Which species are used as biomass ?
- (c) What is the purpose of sunshine recorder ? Explain the working of instrument used for the purpose.
- (d) How energy audit will help to increase profit of industry ?
- (e) Discuss principles of energy conservation.
- (f) State the classification of hydro electric power plant.

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

**16**

- (a) Explain the design principle of box type solar cooker with neat sketch.
  - (b) State the advantages and disadvantages of solar PV system.
  - (c) Explain the working of SPV power plant with sketch.
  - (d) Explain with neat sketch space heating by passive method.
  - (e) Write the site selection consideration for wind mill power plant.
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