

17611

21718

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 : 3 × 4 = 12

- (a) Explain different types of renewable energy sources and its utilization.
- (b) Explain in brief constructional details of solar cooker with neat sketch.
- (c) With the help of sketch, explain solar concentrating collector.
- (d) State and explain in short, components of power generating horizontal axis wind turbine.

(B) Attempt any ONE : 1 × 6 = 6

- (a) Why orientation is needed in concentrating type collector ? Describe the different methods of sun tracking.
- (b) State the uses of following instruments :
 - (i) Lux meter
 - (ii) Pyranometer

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P.T.O.

- (iii) Infrared thermometer
- (iv) Fuel efficiency monitor
- (v) Power analyser
- (vi) Sunshine recorder

2. Attempt any TWO :

2 × 8 = 16

- (a) Define following terms related to solar geometry :
- (i) Altitude angle
 - (ii) Zenith angle
 - (iii) Day length
 - (iv) Solar azimuth angle
 - (v) Surface azimuth angle
 - (vi) Local solar time
 - (vii) Slope
 - (viii) Declination
- (b) (i) Explain in brief anaerobic digestion. What are the factors which affect biogas production ?
- (ii) Compare wet fermentation and dry fermentation. (any four points)
- (c) (i) Define energy audit. Explain in short energy audit of boiler.
- (ii) Explain in brief, how the efficiency of boiler and furnace is calculated.

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3. Attempt any FOUR :

4 × 4 = 16

- (a) Explain with neat sketch fuel cell system.
- (b) State and explain site selection criteria for wind power plant.
- (c) Classify hydro-electric plants. Explain any one in brief.
- (d) Explain solar-vapour compression refrigeration system with suitable sketch.
- (e) List down bio-energy sources. Explain commercial waste.
- (f) Draw sketch of pitot tube and monometer. Explain its use in energy measurement.

4. (A) Attempt any THREE :

4 × 3 = 12

- (a) Explain how green house gases and global warming is affecting the climate change.
- (b) List down advantages and limitations of concentrating collector over flat plate collectors.
- (c) Explain with the neat sketch working of Francis turbine.
- (d) State the different biomass energy sources. What is the energy yield from each of them ?

(B) Attempt any ONE :

1 × 6 = 6

- (a) State and explain different components of small hydroelectric project.
- (b) Explain in detail waste heat recovery system.

P.T.O.

5. Attempt any FOUR :**4 × 4 = 16**

- (a) Explain with neat sketch working of wind energy system with main components.
- (b) Explain in short different energy storage methods used in solar system.
- (c) Explain with neat sketch passive solar heating system.
- (d) Draw neat sketch and define direct, diffused and total radiation.
- (e) Explain working of wind energy conversion system with their main components.
- (f) Explain with sketch single basin arrangement of tidal power generation.

6. Attempt any FOUR :**4 × 4 = 16**

- (a) What is thermal storage ? State any two points of comparison between sensible and latent storage.
 - (b) State any eight applications of solar energy.
 - (c) State advantages and disadvantages of WEC system.
 - (d) (i) Give the list of materials used for biogas generation.
(ii) State the main applications of biogas.
 - (e) Explain the process of "Photosynthesis". What are the conditions, which are necessary for it ?
 - (f) State the principle of Angstrom type pyrhelimeter along with a schematic diagram.
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