17611

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3 Hours / 100 Marks   Seat No.

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. **Solve any FIVE :**   **5 × 4 = 20**

   (a) State the advantages and disadvantages of Renewable energy sources.

   (b) Give classification of Renewable energy sources.

   (c) Explain Solar distillation with neat sketch.

   (d) Describe how the efficiency of boiler and furnace is calculated.

   (e) Explain detailed energy audit methodology.

   (f) Explain lift and drag in wind mill & also state its importance.

   (g) Give classification of wind mills.

2. Solve any TWO : **2 × 8 = 16**

  (a) Explain the structure of Sun with neat sketch.

  (b) (i) State the site selection criteria for small hydro-electric power plants.

      (ii) State the need of alternate energy sources.

  (c) (i) State the uses of following instruments :

          (1) Infrared thermometer

          (2) Fyrite

          (3) Manometer

          (4) Lux meter

      (ii) What is non-solar renewable energy sources ? Give its example.

3. Solve any FOUR: **4 × 4 = 16**

  (a) Explain construction and working of Box type solar cooker.

  (b) What is thermal insulation ? List any four thermal insulation materials.

  (c) Who are the members of OPEC ? Explain the policies of OPEC.

  (d) Define :   (i) Solar Zenit angle (θ_z)

               (ii) Declination angle (δ)

  (e) What are fuel cells ? Explain their principle of operation.

  (f) Explain the process of Photosynthesis in brief.

4. Solve any FOUR: **4 × 4 = 16**

    (a) Describe solar photo-voltaic energy conversion with neat sketch.

    (b) With neat sketch explain passive solar space heating system.

    (c) Draw schematic layout of hydro-electric power plant.

    (d) Explain micro-hydel plant ? Which turbine is best suited for it ?

    (e) Explain with neat sketch Co-Generation in sugar factory.

    (f) What is Sankey diagram ? Explain Sankey diagram for boiler plant.

5. Solve any TWO : **2 × 8 = 16**

    (a) Draw basic structure of Horizontal Axis Wind mill and explain its various components.

    (b) (i) Compare biomass with conventional fuels.

        (ii) Draw neat sketch of solar pump system & also state functions of each component.

    (c) (i) State advantages and limitations of concentrating collectors over flat plate collector.

        (ii) Explain with flow diagram how ethanol can be produced from sugarcane.

6. **Solver any FOUR :** **4 × 4 = 16**

   (a) Define Solar cell, Solar module, Solar panel and Solar array.

   (b) Explain construction and working of Kaplan turbine with neat sketch.

   (c) With neat sketch explain working of Pyranometer.

   (d) Classify various biomass conversion routes and explain anaerobic digestion.

   (e) What is bio-diesel ? State any two applications.

   (f) Define : (i) Gasification

   (ii) Pyrolysis

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