

17645

21819

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. Attempt any FIVE of the following :

20

- (a) Describe the need of alternative energy sources.
- (b) Define primary & secondary energy sources & give two examples.
- (c) Distinguish between beam radiation & diffused radiation.
- (d) State the types of solar heating system.
- (e) Draw functional block diagram of photovoltaic power generation system & explain its working.
- (f) Describe construction & working of pyrheliometer for measurement of beam radiation.
- (g) Explain the term solar constant & state its value.

- 2. Attempt any FOUR of the following :** **16**
- (a) Describe construction & operation of Solar furnaces.
 - (b) How total radiation of solar is measured by pyranometer ?
 - (c) State the salient feature & characteristics of induction generators used in wind mills.
 - (d) Define alongwith diagram incident angle, zenith angle, solar azimuth angle & hour angle.
 - (e) Classify the biomass plants.
 - (f) Draw a neat diagram to show spectral distribution of extra terrestrial solar radiation.
- 3. Attempt any TWO of the following :** **16**
- (a) Explain the energy scenario in India in context of energy production, energy consumption, various sources & their limitations.
 - (b) State types of wind turbines and explain any one of them.
 - (c) Explain with neat sketch construction & operation of Open Cycle & Closed Cycle Ocean Thermal Energy Conversion (OTEC) plant.
- 4. Attempt any FOUR of the following :** **16**
- (a) Define the following methods of energy generation from (i) Biomass combustion, (ii) Anaerobic digestion, (iii) Pyrolysis, (iv) Gasification.
 - (b) How the energy can be obtained from biomass using fermentation ?
 - (c) State the principle of tidal power generation. Also state its application.
 - (d) Draw a neat sketch of Flat plate collectors & label it.
 - (e) State the areas of application of wind energy. Explain any one in brief.
 - (f) List advantages & disadvantages of Dome & Drum type biomass plants. (two each)

5. Attempt any TWO of the following :**16**

- (a) Draw a neat labelled sketch of any one type of fixed bed gasifier and explain its working.
- (b) Explain construction & working of parabolic dish collector with labelled diagram.
- (c) Describe the operation of single basin & double basin arrangement for tidal power generation with neat sketch.

6. Attempt any TWO of the following :**16**

- (a) Explain the construction & operation of Solar green house with neat sketch.
 - (b) Draw block diagram of constant speed constant frequency system for wind generation. Also describe working on it.
 - (c) Explain with neat sketch Geothermal Power Plant.
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