17645

15116

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory*.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) 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) Define primary energy sources; secondary sources and supplementary sources with its examples.

b) Explain the prospects of renewable sources of energy with reference to Indian context.

c) Define the following terms related to solar radiation geometry:

(i) Latitude of location

(ii) Declination

(iii) Solar azimuth angle

(iv) Zenith angle

d) Draw the V-I characteristics of solar cell. Also define the efficiency of solar PV cell.

Marks

e) State the salient features and characteristics of induction generators used in wind mills.

f) What are the different biomass energy resources? Briefly explain about 'combustion' method of obtaining energy from biomass.

g) State the applications and advantages of Hydrogen energy.

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

a) Explain the energy scenario in India in context of energy production; energy consumption; various sources and their limitations.

b) Explain with suitable diagram the construction, working and limitations of pyrheliometer for measurement of beam radiation.

c) Describe the construction and limitations of pyranometer used for measuring total solar radiations.

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

a) Explain with neat sketch the construction, working and application of flat plate collectors.

b) With the functional block diagram of photo-voltaic power generating system explain its operation. Also state its advantages and disadvantages (any two).

c) Explain with the principle, working and advantages of solar pond.

Marks

4. Attempt any FOUR of the following: **16**

a) Define tilt factor for beam radiation. State the factor on which the value of tilt factor depends.

b) Explain the construction and operation of solar green house.

c) State any four advantages of solar water pumping system.

d) State the areas of application of wind energy. Explain any one in brief.

e) Explain briefly the anaerobic digestion method of obtaining energy from biomass.

f) State any four main components of tidal power plants and their functions.

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

a) Explain the main considerations of site selection for Wind Energy Conversion System.

b) Explain construction, working, advantages and disadvantages of horizontal axis wind mill.

c) Explain in brief with neat sketch floating drum (constant pressure) type biogas plants and fixed dome (constant volume) type biogas plant. State their relative merits and demerits.

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

a) Explain with neat sketch working of any one type of fixed bed gasifier.

b) Explain with neat sketch construction and operation of open cycle and closed cycle Ocean Thermal Energy Conversion (OTEC) plant.

c) State any four advantages, four disadvantages and four applications of geothermal energy. State the various geothermal sources.

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