17645

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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. A) Attempt **any three** of the following : **12**

a) State the necessity of alternate energy sources.

b) Define the following and give two examples of each

i) Primary energy source

ii) Secondary energy source.

c) Define the following with respect to solar energy

i) ZenithAngle.

ii) SolarAzimuthAngle.

iii) HourAngle.

iv) Declination.

d) State the equipments used for solar radiation measurement and explain any one in brief.

B) Attempt **any one** of the following : **6**

a) Draw a neat diagram showing distribution of solar energy as direct, diffused, global radiation, reflected radiation etc. Explain these radiations in brief.

b) State different types of solar collectors and explain any one in detail.

2. Attempt **any four** : **16**

a) Explain the factors involved in environmental aspects of energy and sustainable development.

b) Define solar constant and write its formula.

c) Explain construction and operation of box type solar cooker.

d) Describe the working principle of solar pond. State its application.

e) State the criteria for site selection of wind mill.

f) Differentiate between horizontal and vertical axis wind mills. (any 4 points).

P.T.O.

Marks

3. Attempt **any four** : **16**

a) State various sources of renewable energy. Also mention their total potential till date (Draw a pie-chart for it).

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

c) Classify bioenergy sources and briefly explain each source.

d) Differentiate between Dome type and Drum type biomass plants (any 4 points).

e) State any four components of tidal power plant and their functions.

4. A) Attempt **any three** of the following : **12**

a) Explain construction and operation of solar green house.

b) Differentiate between "Power In wind" and "Maximum Power" (any 4 points).

c) Explain in brief "fixed bed gasifier" in biomass plant.

d) State any four advantages of geothermal energy.

B) Attempt **any one** of the following : **6**

a) Draw block diagram showing basic components of wind electric system and state function of each block.

b) Describe following with reference to biomass plant :

. Combustion

. Pyrolysis

. Fermentation.

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

a) State the limitations of pyrheliometer for measurement of beam radiation.

b) With neat diagram explain construction of solar PV module.

c) Draw neat diagrams of continuous and batch type biomass plant.

d) State two advantages and two limitations of hydrogen energy.

e) Describe principle of operation of fuel cell with neat sketch.

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

a) Draw block diagram of photovoltatic power generating system. State its advantages and disadvantages.

b) Draw block diagram and explain working in brief for following wind electric systems.

i) Constant speed constant frequency.

ii) Variable speed constant frequency.

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