17645

21718

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

Instructions : *(1)* ***All*** *questions are* ***compulsory****.*
(2) Answer each Section on same/separate answer sheet.
(3) Answer ***each*** *next main question on a* ***new*** *page.*
(4) Illustrate your answers with neat sketches ***wherever*** *necessary.*
(5) Figures to the ***right*** *indicate* ***full*** *marks.*
(6) Assume suitable data, if ***necessary****.*
(7) 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) Define primary energy sources, secondary sources and supplementary sources with its examples.

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

c) Draw the VI characteristics of solar cell. Also define efficiency of solar PV cell.

d) Describe the meaning of terms :
   i) Power coefficient
   ii) Thrust on turbine related to wind energy.

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

i) Describe the distribution of solar energy as direct, diffused and total radiation with the help diagram.

ii) Describe with neat diagram the working of fixed dome type biogas plant.

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

a) Describe the environmental aspects of energy and sustainable development.

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

c) State the main consideration in selecting site for wind energy conversion system.

d) Define the following method of energy generation from bio-mass.
   i) Combustion ii) Anaerobic digestion
   iii) Pyrolysis iv) Gasification

e) Differentiate between drum type and dome type bio-mass plant.

f) Describe the operation of single basin arrangement for tidal power generation with neat diagram.

P.T.O.

Marks

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

a) State any two advantages and disadvantages of renewable energy sources.

b) Explain with neat sketch the construction and working of the flate plate collectors.

c) State advantages and limitations of box type solar cooker.

d) Compare horizontal axis wind mills to vertical axis wind mills (any four).

e) Explain how the energy can be obtained from biomass using fermentation method.

f) List advantages and disadvantages of Hydrogen Energy.

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

i) Describe the necessity of alternative energy sources.

ii) Describe the working of pyrano-meter for measurement of total radiation.

iii) State any two advantages and disadvantages each of photo-volatic power generating station.

iv) State the difference between 'Fixed bed gasifier' and 'fluidized bed gasifier'.

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

i) Define following terms :

i) Altitude angle ii) Incident angle

iii) Zenith angle iv) Solar azimuth angle

v) Declination angle vi) Hour angle

ii) Describe with schematic diagram construction and operation of open cycle OTEC plant.

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

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

b) List the applications of solar space heating and cooling.

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

d) Describe with diagram working of variable speed frequency wind electric generating system.

e) State the advantages and disadvantages of floating drum type biomass plant.

f) Describe with block diagram fuel cell based electrical power generating scheme.

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

a) Explain principle, working and advantages of solar pond.

b) Draw block diagram showing basic components of wind energy conversion system and state function of each block.

c) State advantages, disadvantages and applications each of geothermal energy (four each).