Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(EE-NEW)/SEM-7/EE-704-E/2009-10

2009

NON-CONVENTIONAL ENERGY SOURCES

Time Allotted : 3 Hours | Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) The standard value for solar constant as per NASA standard is

   a) 1150 W/m ^{2} b) 1353 W/m ^{2}

   c) 2100 W/m ^{2} d) 1825 W/m ^{2}.

   ii) A geothermal field may yield

   a) dry steam b) wet steam

   c) hot air d) all of these.

   iii) Tidal energy utilises

   a) kinetic energy of water

   b) potential energy of water

   c) both kinetic and potential energies of water

   d) none of these.

iv) The greenhouse gas is

a) carbon dioxide b) methane

c) nitrous oxide d) all of these.

v) An illuminated solar cell is

a) constant voltage device

b) constant current device

c) constant power output device

d) none of these.

vi) Which is not renewable energy source ?

a) hydropower b) tidal power

c) geothermal d) fuel cell.

vii) Bio-gas consists of

a) only methane

b) methane and carbon dioxide

c) only ethane

d) none of these

e) all of these.

viii) Fill factor indicates the

a) solar radiation b) energy of a solar cell

c) quality of solar cell d) none of these.

ix) The output of a solar cell is of the order of

a) 0·5 W b) 1·5 W

c) 5·0 W d) 7·5 W.

x) Dolphin mechanism is a method of extracting

a) solar energy b) wind energy

c) ocean energy d) geothermal energy.

xi) Tidal power plants are built on

a) seashore b) cricks

c) plates d) mountain range.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. How is geothermal energy generated inside the earth crust ? In India where is geothermal energy available ?

3. Explain the types of generators used with wind turbines for producing electricity.

4. List the advantages and disadvantages of a tidal barrage scheme as a source of electrical power.

5. a) Give the list of materials used for bio-gas generation.

   b) Write the main applications of bio-gas.

6. What are the main advantages and disadvantages of bio-mass energy ? Explain the process of photosynthesis.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Discuss on spectral energy distribution of solar radiation with the help of a suitable diagram. Discuss on depletion of solar radiation. How is electrical power produced by distributed collector solar thermal electrical power plant ? Discuss how solar energy is transferred into electrical energy in solar PV cell ? What do you mean by CR of collector ? Discuss on fixed mirror solar collector.

$2 + 2 + 3 + 4 + 2 + 2$

8. a) Briefly describe a silicon solar cell along with its constructional features.

   b) How can you get the maximum power output from a solar cell ?

   c) What is a photovoltaic system ?

   d) Compare monocrystalline, polycrystalline and amorphous silicon as materials for solar cell.

   5 + 2 + 3 + 5

9. a) What are the different types of geothermal resources ?

   b) What are the major applications of geothermal energy ?

   c) What principles guide in the location of a geothermal power station ?

   d) What is the prospect of geothermal energy ?

   3 + 2 + 5 + 5

10. What is fuel cell ? Discuss different types of fuel cell. What are the advantages of fuel cell energy ? Discuss on alkaline fuel cell and hydrogen fuel cell. 2 + 3 + 3 + 3 + 4

11. Write short notes on any *three* of the following : 3 × 5

    a) Magnetohydrodynamic energy conversion

    b) Microhydel generation

    c) Advantages of non-conventional sources over conventional sources.

    d) Biodisel

    e) Wave energy.