Total No. of printed pages = 9

END SEMESTER EXAMINATION – 2022

Semester : 5th(New)

Subject Code : El/Me/Au/IPE-505

NON-CONVENTIONAL ENERGY

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer any *five* questions from PART–B .

PART – A

Marks – 25

1. Choose the correct answers from the following : 1×15=15

   (i) Which of the following is the local name of biogas in rural areas ?

   (a) Marsh gas (b) Wood gas

   (c) Gobar gas (d) Water gas

(ii) Renewable energy is called 'green power' because

(a) It does not produce any harmful pollutants

(b) It is green in colour

(c) It is only produced from green plants

(d) None of the above

(iii) Which of the following is a biodegradable waste ?

(a) Vegetable and fruit peel

(b) Silver foil

(c) Detergent

(d) Rubber

(iv) In a box type solar cooker the box is covered with

(a) Double glass layer

(b) Single glass layer

(c) Triple glass layer

(d) None of the above

(v) The solar cooker normally used in houses is known as

(a) Box-type solar cooker

(b) Dish-type solar cooker

(c) Reflector-type solar cooker

(d) Circular solar cooker

(vi) Horizontal-axis wind mills of modern design can

(a) always turn to face wind

(b) not adjust its output

(c) not turn to winds directions

(d) not turn to face wind

(vii) Which is the most common material used for making solar cells ?

(a) Silver (b) Iron

(c) Aluminium (d) Silicon

(viii) Biogas contains approximately

(a) 30% methane and 60% carbon-dioxide

(b) 2% methane and 98% carbon-dioxide

(c) 55% methane and 40% carbon-dioxide

(d) 80% methane and 20% carbon-dioxide

(ix) Electrical output of a solar cell depends on

(a) Intensity of solar radiation

(b) Heat component of solar radiation

(c) UV component of solar radiation

(d) MIR component of solar radiation

(x) The optimal pH for biogas production ranges between

(a) 2.3 and 4.5 (b) 5 and 5.6

(c) 8 and 9.5 (d) 6.8 and 7.2

(xi) Large amount of solar energy is stored in the oceans and seas. The process of harnessing this energy is called

(a) OTEC (ocean thermal energy conversion)

(b) OTC (ocean thermal conversion)

(c) OSTEC (ocean and sea thermal energy conversion)

(d) STEC (sea thermal energy conversion)

(xii) Gasification of biomass is which type of conversion process ?

(a) Chemical (b) Biological

(c) Biochemical (d) Thermo-chemical

(xiii) Wind turbines are controlled by

(a) Built-on computer

(b) An operator

(c) Electricity board

(d) None of the above

(xiv) The value of solar constant is about

(a) 6.5 kW/m^2 (b) 1.36 kW/m^2

(c) 10 kW/m^2 (d) 3.64 kW/m^2

(xv) Important factors for biogas production are

(a) pH (b) C/N ratio

(c) Temperature (d) All of these

2. Fill in the blanks : $1 \times 5 = 5$

(a) Deenbandhu design of biogas plant was developed by _____.

(b) KVIC design of biogas plant was developed in _____.

(c) Solar energy moves through space to the earth by _____.

(d) Solar photovoltaic cells convert solar energy directly into _____ energy.

(e) Ethanol can be blended with _____ for use in engines.

3. State true or false : 1×5=5

(a) Greenhouse gases responsible for global warming.

(b) The heat from the interior of the earth that can be utilized as source of energy is called tidal energy.

(c) Carbon monoxide has a major share in biogas.

(d) The materials that do not decay and remain in the environment are called bio-degradable.

(e) Solar lantern is a fixed-type solar lighting system.

PART – B

Marks – 45

4. (a) Differentiate between conventional and non-conventional energy with examples. 2

(b) What is a solar constant ? 2

(c) Explain the operation of a solar cooker with the help of a neat sketch. 5

5. (a) What is solar insolation ? 2

(b) Write notes on Vertical axis and Horizontal axis wind turbines. 3

(c) Describe with a neat sketch the working of Wind Energy Conversion System (WECS). 4

6. (a) What is meant by anaerobic digestion ? 2

(b) What are the different forms of biomass conversion ? 2

(c) Explain the constructional detail and working of Pragati biogas plant. 5

7. (a) What are the advantages and disadvantages of a fuel cell ? 3

(b) What are the main components of a Tidal Power Plant ? 3

(c) Write the different applications of Hydrogen energy. 3

8. (a) What is a thermoelectric power generator ? 2

(b) Write notes on thermo-ionic emission and work function. 3

(c) Describe an MHD open cycle system. 4

9. (a) What are the geothermal energy sources ? 2

(b) What are the applications of geothermal energy ? 2

(c) Explain with block diagram the working of an open cycle OTEC plant. 5