

RENEWABLE ENERGY POWER PLANT*Time Allowed: 2.5 Hours**Full Marks: 60*

Answer to Question No. 1 & 2 are compulsory and to be answered first. This answer is to be made in separate loose script(s) provided for the purpose. Maximum time allowed is 30 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering the remaining part of the question will be provided. On early submission of answer scripts of Question No 1 & 2, a student will get the remaining script earlier.
Answer any Eight (08) Questions from the rest.

1. Choose the correct answer from the alternatives (any ten): 1x10
- i) Which parameter is used as an index for standard of living of the people of a country?
- Industrial production
 - Number of vehicles per house
 - Per capita energy consumption
 - Population density
- ii) A Pyranometer is used for measurement of
- direct radiation only
 - diffuse radiation only
 - direct as well as diffuse radiation
 - All of the above
- iii) On which of the following variable parameters do wind energy generation depends on?
- Temperature
 - Humidity
 - Velocity
 - All of the above
- iv) Which process is responsible for production of energy in the sun?
- Nuclear fission reaction
 - Nuclear fusion reaction
 - Exothermal chemical reaction
 - All of the above
- v) The ratio of PV cell's actual maximum power output to its theoretical power output is called
- Quantum Factor
 - Fill Factor
 - Quantum Efficiency
 - PV Factor
- vi) Which of the following component of wind mill collects wind based energy?
- Generator
 - Hub
 - Rotor
 - Blades

- vii) Which type of wind turbine has better performance?
- Vertical type wind turbine
 - Darrieus type wind turbine
 - Magnus type wind turbine
 - Horizontal type wind turbine
- viii) Small hydro plants (SHPs) have
- high head and small capacity.
 - low head and small capacity.
 - low head and large capacity.
 - large head and large capacity.
- ix) The term biomass most commonly refers to
- Inorganic matter
 - Chemicals
 - Ammonium compounds
 - Organic matter
- x) Bio diesel is produced by the _____ of the vegetable oil.
- Fermentation
 - Distillation
 - Transesterification
 - Rectification
- xi) Non-conventional forms of energy are considered as non-reliable sources because
- they are very expensive.
 - they are difficult to assemble.
 - they produce large pollution.
 - availability can change due to climatic condition.
- xii) The plants in which process of conversion of kinetic energy of flowing water into electric energy takes place is known as
- thermal power plant
 - hydro power plant
 - bio mass
 - gobar gas
- xiii) Hydroelectric power plant is mainly located in _____.
- Flat areas
 - Deserts
 - Hilly areas
 - Deltas
- xiv) Which of the following is not a biomass?
- Plants and trees
 - Wood
 - Cattle dung
 - Water
- xv) The energy payback period of wind generation is:
- 1 year
 - 2 years
 - 3 years
 - 4 years

2. Fill in the blanks (any ten):

1x10

- i) The wind speed is measured using an instrument called _____.
- ii) A hydroelectric power plant station is commonly found in _____ area.
- iii) The primary greenhouse gas is _____.
- iv) Biogas is produced by the _____ of animal wastes or plant wastes in the presence of water.
- v) Kaplan is a kind of _____ turbine.
- vi) A generator coupled to wind turbine is known as _____.
- vii) Bio-gas is also known as _____.
- viii) From the sun the solar energy is radiated in the form of _____ waves.
- ix) Plants convert solar energy into _____ energy.
- x) _____ surface can absorb maximum radiations coming from Sun.
- xi) Combination of large number of solar cells connected in series is called _____.
- xii) _____ is the most widely used solar material.
- xiii) Generator is a device which converts _____.
- xiv) Global warming is mainly due to _____.
- xv) National Institute of Wind Energy (NIWE) is situated in the city _____.

3. What do you mean by renewable energy? State the advantages and disadvantages of non-conventional energy. 5

4. How solar energy can be converted into electrical energy? Give a diagram showing the elements of such a plant. 5

5. Define: 2.5x2

- i) Solar azimuth angle
 - ii) Surface azimuth angle
- Draw necessary diagrams.

6. With the help of a neat diagram, explain the layout & working of a micro hydro power plant. 5

7. With a neat sketch explain the functions of the main components of a HAWT. 5

8. Discuss the main feature of renewable energy sources. 5

9. Explain the process of Transesterification with block diagram. 5

10. Write short notes on (any two): 2.5x2

- i) Pyranometer
- ii) Pelton turbine
- iii) Kaplan turbine

11. Explain the process of production of bio-gas from bio-mass with diagram. 5

12. What are the main advantages and disadvantages of bio-mass energy? 5