KERALA AGRICULTURAL UNIVERSITY

B. Tech. (Agrl. Engg.) 2021 Admission

VI Semester Final Examination – June 2024

Fpme.3215 **Energy Technology for Renewable Power Production (2+0)** **Marks: 50**

Time: 2 hours

I **Choose the correct answer** **(10x1=10)**

1. With reference to combustion, MATT stands for abbreviation :
   (a) Mass, Air, Time, Turbulence
   (b) Mixture, Air, Time, Temperature
   (c) Mass, Air, Time, Temperature
   (d) Mixture, Air, Time, Turbulence
2. Surge tank in a hydroelectric power plant helps
   (a) Develop high pressure head for reactor
   (b) Source for continuous supply of water
   (c) Reduce the pressure fluctuations
   (d) Separates and store excess water sent to the turbine
3. Pyranometer is a device that measures the intensity of solar radiation by collecting radiations
   (a) Falling perpendicular to the solar panel
   (b) Falling perpendicular to the surface of earth
   (c) Coming hemispherically at the point of detection
   (d) From the diffused light reflected back from the earth surface
4. In wind farms, the distance between two wind turbine along axial direction in unit of diameter of wind turbine span is
   (a) 1D;
   (b) 2D;
   (c) 4D;
   (d) 8D

State True or False

5. Ethanol can be used as equivalent fuel in place of petrol.

Answer the following

6. Define a primary battery.
7. Define a vertical axis wind turbine.
8. Give the component of tidal power plant.
9. Give the expression for coefficient of power in wind power plant.

Fill in the blanks

10. Example of reaction turbine is ……..

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Explain what are Primary Energy Sources.
2. Justify in brief, how small and micro hydro power is the environmentally cleanest power?
3. Explain what is polarization in Fuel Cell? State its implication on cell performance.
4. Enumerate the types of storage envisaged for hydrogen gas.
5. Explain what is wind shear?
6. Principles of OTEC systems.
7. Compare and contrast horizontal axis and vertical axis wind turbines.

III **Answer ANY FIVE of the following** **(5x4=20)**

1. Define two types of ocean thermal energy conversion system (OTEC) in practice. Mention the typical working fluid used in each type.
2. Classify the hydroelectric power plants based on
   (a) power capacity
   (b) water head
3. A solar module has a specification of 2A/12V. Sketch the configurations of the modules into arrays to obtain 48V/12A output. Assume no loss in the assembly
4. Briefly explain MHD power generation.
5. Possible power generation technologies from urban and municipal wastes with their significance on field level adoption
6. Discuss various technological options for the storage of hydrogen.
7. Give the equivalent circuit of a solar cell. Plot the current voltage characteristics of the solar cell. Give the expression for maximum power generation.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Classify various types of nuclear reactors. Write a note on India's nuclear power programme. Give the layout of a pressurized water reactor.
2. Give an account on various renewable energy sources. Comment on the potential of any two renewable energy sources available in India.

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