



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Agri. Engg) 2017 Admission

IV Semester Final Examination-June 2019

Fpme.2208

Fundamentals of Renewable Energy Sources (2+1)

Marks: 50

Time: 2 hours

(10x1=10)

- 1 Fill in the blanks.
- 1 The earth's radiation is often referred to as _____ radiation, while the sun's radiation is often referred to as _____ radiation
 - 2 Gasifier suitable for running internal combustion engine is _____.
 - 3 If a biomass has high moisture content, it is not suitable for _____ conversion
 - 4 For operation of 4m³ biogas plant, quantity of cattle dung needed daily is _____
 - 5 Biodiesel can be made from biomass which have _____

State True or False

- 6 In order to have optimum solar energy in northern hemisphere, the solar collectors are tilted towards south
- 7 Biomass can produce fuels in solid, liquid and gaseous forms
- 8 An average wind speed of 7m/sec is required to convert wind energy to electricity
- 9 Retention time for a biogas plant is lower for low temperature area
- 10 Solar photovoltaic use thermal energy component of sun's radiation.

II Write short notes on ANY FIVE

(5x2=10)

- 1 Distinguish between global solar radiation, direct and diffuse solar radiation
- 2 Distinguish between pyrolysis, gasification and combustion
- 3 Transesterification.
- 4 Relationship between hydraulic retention time and daily loading rate for semi-continuous type biogas plants.
- 5 Effect of Carbon Nitrogen (C/N) Ratio on Biogas Production
- 6 How much area is required for installation of 1 kWp solar photovoltaic plant
- 7 Why Downdraft gasifier has lower tar content than that of updraft gasifier?

III Answer any FIVE of the following.

(5x4=20)

- 1 Derive the expression for power developed due to wind. What is maximum theoretical power you can get from wind.
- 2 How photovoltaic cell is made. Discuss its working?
- 3 Advantages and disadvantages of Renewable sources and Non Renewable sources.
- 4 Draw a labeled diagram of Janta Biogas plant. Discuss its working
- 5 Working principles of box type solar cooker with the help of neat sketch.
- 6 Compare the horizontal and vertical axis wind turbines
- 7 Draw the flow chart of production of ethanol from starchy biomass.

IV Answer any ONE of the following

(1x10=10)

- 1 Draw the labeled diagram of updraft gasifier and write equations for each zone separately. Mention the temperatures and energy for each equation.
- 2 Explain with the help of diagram different phases of anaerobic digestion for biogas generation along with diagram. Discuss briefly the factors which affect these phases which can help in increasing biogas production
