



**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech.(Agri. Engg.) 2019 Admission**  
**IV Semester Final Examination- November 2021**

**Fpme. 2208**

**Fundamentals of Renewable Energy Sources (2+1)**

**Marks: 50**  
**Time: 2 hours**  
**(10x1=10)**

**I Fill in the blanks**

1. Zenith angle is \_\_\_\_\_ to altitude angle.
2. Calorific value of producer gas is one fourth of \_\_\_\_\_.
3. A 5 KW engine can run for \_\_\_\_\_ hours/day on 50 m<sup>3</sup> biogas plant.
4. The power of wind is proportional to \_\_\_\_\_ of velocity.
5. Equivalence ratio for the stoichiometric combustion is \_\_\_\_\_.

**State True or False**

6. Efficiency of solar panel increase with increase in temperature.
7. Retention time is a directly proportional to temperature of a place.
8. Single step concentrating solar collectors are generally used for temperature required upto 300° C.
9. Downdraft gasifier is better than updraft gasifier for running internal combustion engine.
10. Pyranometer measures diffuse radiation only.

**II Write short notes on ANY FIVE of the following**

**(5x2=10)**

1. Differentiate between lower and higher calorific value
2. Differentiate between cell, module and array.
3. Why Downdraft gasifier has lower tar content than that of updraft gasifier
4. Differentiate between syn gas and producer gas
5. Discuss different blends of ethanol and biodiesel with conventional fuels
6. Write a short note on Flat plat collector
7. Write a short note on Betz limit

**III Answer ANY FIVE of the following**

**(5x4=20)**

1. Define Renewable energy. Draw the diagram showing average time taken for different sources of energy to get renewed.
2. Compare the horizontal and vertical axis wind turbines
3. Draw the flow chart of processes of anaerobic decomposition for biogas generation and explain each process.
4. List the factors required for good combustion
5. Compare the efficiencies of solar flat plate and evacuated tube collector
6. Explain the process of biodiesel production from vegetable oils.
7. Compare moveable versus fixed dome biogas plants



IV

**Write an essay on ANY ONE of the following**

**(1x10=10)**

1. Draw the labeled diagram of downdraft gasifier and write equations for each zone separately. Mention the temperatures and energy for each equation.
2. Discuss the working principle , advantages and disadvantages of focusing solar cooker and box type solar cooker

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