

# KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg) 2013 Admission

V<sup>th</sup> Semester Final Examination-January -2016

Cat. No: Fden 3108

Title: Energy for Food Industries (1+1)

Marks: 50.00

Time: 2 hours

## I Fill in the blanks of all questions

(10 x 1=10)

1. The efficiency of photovoltaic solar is around .....%
2. The value of solar constant is .....W/m<sup>2</sup>
3. Atomic energy is ..... type of energy
4. .... energy is used in absorption type refrigeration system
5. A Pyranometer is used to measure ..... solar radiation
6. The temperature of water from a solar water heater is about .....
7. Calorific value of the gas produced in a wood based gasifier is about .....
8. A group of solar cells is known as .....
9. The minimum wind velocity for operating a wind generator is ..... km/h
10. LNG stands for .....

## II Answer any Five of the following

(5 x 2=10)

1. What is meant by *pyrolysis*?
2. Draw a line diagram of Solar Cabinet Dryer
3. What do you understand by *Renewable Energy* and *Non Renewable Energy*?
4. Give a brief note on *Heat energy recovery in Food industries*
5. Write a short note on *Tidal Energy*
6. Give a brief note on *Solar Refrigeration*
7. State the properties of biomass and their importance in gasification

## III Answer any Five questions

(5 x 4=20)

1. Write a note on *Solar Flat Plate Collector*
2. Describe the principle of a Photo Voltaic cell
3. How can the renewable energy systems be exploited in food industry?
4. Write a detailed note on *Energy Auditing*
5. Explain the principle of operation of *Solar Cooker* with neat sketch
6. Derive the expression for estimating power from wind
7. Define and explain with line sketches.(a) Sun's declination. (b) Altitude angle (c) Zenith angle and (d) Solar azimuth angle

**IV Answer any one question**

**(1 x 10=10)**

1. Explain with diagram the various processes in thermo chemical gasification. What are important chemical reactions?
2. Explain the different technologies used for heat energy recovery and waste heat utilization in food industries. What is the scope and technologies for utilization of organic wastes for energy production?

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