KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg) 2012 Admission
V th Semester Final Examination- January -2015

Cat. No: Fpme.3114

Title: Renewable Energy Source (2+1)

Marks: 80

Time: 3 hours

1   **Fill up the blanks**   5x1 = 5

i)   1 KVA generator requires .... m³ /h biomass.

ii)   One Langley is equivalent to ....

iii)   Sum of direct and diffused radiation is collectively called........

iv)   Air Mass at the sea level is ....

v)   Energy is radiated by the sun as ....waves.

2.   **Choose the correct answer**   5x1 = 5

(Vi)   The process in which solar water heater utilizes the soar energy for heating the water is known as ....
(a) solar photovltaic   (b) solar thermal
(c) Solar cells   (d) solar electricity

(Vii)   Which of these is not a renewable energy source ?
(a) Wind   (b) solar
(c) Natural gas   (d) Biomass

(Viii) Which of the following provides energy?
(a) Fat   (b) Protein
(c) Both of the above   (d) None

(IX)   A Solar cooker is device used for
(a) Heating water   (b) Cooking food
(c) Drying cloths   (d) making only tea

(X)   The temperature in dish type solar cooker can reach up to
(a) 5^0C   (b) 200^0C
(c) 1000 °C   (d) 5000 °C

2.   Write short Notes on **any ten questions**   10x3 = 30

i)   Tip speed ratio   vii)   Fossil fuel energy

ii)   Solidity   viii)   Solar energy

iii)   Biomethanization   ix)   Ocean thermal energy

iv)   solar insulation   x)   Hour angle

v)   Briquetting technology   xi)   Zenith angle

vi)   Use of pv- energy   xii)   Renewal energy

3. Write answer on any six of following $6 \times 5 = 30$

(i) What are different technologies to extract power from biomass?

(ii) What is the gasification technology? What are the differences between updraft and down draft gasifies.

(iii) Describe the I-V characteristics of a solar cell and define fill factor. What is the significance of fill factor?

(iv) What are the advantages of briquetting technology?

(v) Prove that for wind power, $P = \frac{1}{2} \rho v^3 c_p$

(vi) What are the advantages and disadvantages of solar energy

(vii) Explain factors affecting production of biogas.

(Viii) Explain the natural circulation pressurized solar water heater with a neat sketch

4. **Write answer on any one** $1 \times 10 = 10$

i. A horizontal axis wind mill with 5 m diameter rotor is used for pumping water at a head of 5 m with av. wind velocity of 3 ms^{-1}. If the power co-efficient of the rotor is 0.35 and the conversion efficiency of the rotor power into hydraulic power is 45%, calculate the average output of wind mill.

ii. Design a biogas plant for a farmer having 20 dairy animals. Assume dung production per animal in a day as 11 kg, density of slurry 500 kgm^{-3}, 1 kg cow dung produces 0.1m^3 of gas. Take retention time is 40 days.