MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester	: VI (New)	Term	: II	Academic Year	: 2016-17
Course No.	: EOES 365	Title	: Renewable Energy Sources		
Credits	: 3 (2+1)				
Day & Date	: Monday, 08.05.2017	Time	: 09.00 to 12.00	Total Marks	: 80

Note :
1. Solve **ANY EIGHT** questions from **SECTION "A"**.
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

Q.1 a) Explain with neat sketches about contrast between renewable and finite energy supplies with environmental and harnessed energy flow.

    b) Give comparison of renewable and conventional energy sources.

Q.2 a) Explain physical conversion of solar radiation into heat using flat plate collect.

    b) Enlist different applications of flat plate collector. Explain any one.

Q.3 Explain principle of combustion of biomass. Enlist important parameters affecting combustion. Elaborate the conditions for efficient combustion of biomass.

Q.4 Explain gasification processes in detail. Describe the impact of different properties of fuel, which influence gasification.

Q.5 a) Enlist different factors affecting biodigestion. Explain the effect of temperature and hydrogen ion concentration on biogas generation.

    b) The family size biogas plant suitable for five cows is having following data:

i) Retention period :20 days ii) Temperature :35^0C iii) Biogas yield :0.24 m^3/kg (dry matter) iv) Dry matter consumed : 3 kg /day /cow v) Efficiency of burner: 60%. vi) Methane production :0.8 vii) CV of methane : 28 MJ/m^3

Calculate : i) Volume of digester(m^3) ii) Power generated from digester (kWh/day)

Q.6 a) Enlist different wind energy conversion devices. Compare horizontal and vertical axis wind machines.

    b) What are the applications of Ocean Thermal Energy Conversion system? Explain open cycle Ocean Thermal Energy conversion system for electricity generation.

Q.7 a) Explain working of solar photovoltaic cell. Explain functions of each component of PV based power system.

    b) Enlist different applications of Solar Photovoltaic system and describe solar PV deep well water pumping system.

(P.T.O.)

Q.8 **a)** Determine the number of collector array for daily heating need of 150 kWh/day. The average solar intensity is 05 kWh/m². day. Each panel has area of 2 m² and 60 % thermal efficiency

b) Describe natural circulation solar water heating system with neat sketch.

Q.9 What is solar cooking? Give classification of solar cookers. Explain parabolidal type solar cooker with neat sketch.

Q.10 Write short notes (Any Two).

1) Hydro electric power generation   2) Biodiesel production

3) Wind energy conversion devices

SECTION "B"

Q.11 State True or False.

1) Gasification is the process of heating of biomass in absence of air.

2) The average calorific value of producer gas is 4717 kJ/Nm³.

3) Gasification process is biochemical conversion of solid into gaseous fuel.

4) The briquettes has diameter greater than 30 mm.

5) Constant gas pressure is available in fixed dome type biogas.

6) Solar thermal devices are normally oriented towards South in India.

7) Solar PV cell converts solar energy into alternate current.

8) In horizontal axis wind machine, rotor weight is less.

Q.12 Fill in the blanks.

1) The _____ is the source of all energy sources.

2) The wind turbine converts _____ energy into mechanical energy.

3) The biomethanation process converts the solid biomass into _____ fuel.

4) The digestion of the biomass in presence of air is called _____ digestion.

5) To obtain the higher output voltage, PV arrays are connected in _____.

6) The C:N ratio suitable for biogas production is _____.

7) The flat plate collectors are used to attend the temperature up to _____.

8) _____ biogas plants are more costly than floating drum biogas plants.

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