

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Tech. (Agril. Engg.)

Semester : VI (Old)	Term : II	Academic Year : 2017-18
Course No. : EOES 365	Title : Renewable Energy Sources	
Credits : 3 (2+1)	Time : 09.00 to 12.00	Total Marks : 80
Day & Date : Saturday, 05.05.2018		

- 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) Classify Energy Sources.
b) Define renewable and non-renewable energy and compare it with suitable examples.
- Q.2 a) Define biomass gasification. State the classification of biomass gasifiers.
b) Compare updraft and down draft gasifiers.
- Q.3 a) Explain in brief, the factors affecting biogas generation.
b) The following data are given for a family biogas digester suitable for the out put of five cows: the retention time is 20 days, temperature 30°C , dry matter consumed per day = 2 kg, biogas yield is 0.24 m^3 per kg. The efficiency of burner is 60%, methane proportion is 0.8. Heat of combustion of methane = 28 MJ/m^3 . Calculate (i) the volume of biogas digester and (ii) the power available from the digester.
- Q.4 a) What is meant by solar cell? Enumerate the advantages and disadvantages of the solar cell system.
b) Determine the collector area to supply 200 liters per day hot water at 65°C for a family at location, where average radiation intensity available is 6 kWh/m^2 . The temperature of supply water to the bottom of storage tank is 15°C . Collection efficiency may be assumed to be 30%
- Q.5 a) Describe in detail horizontal axis two aerodynamic blade wind mill.
b) Draw the sketches of various solar drier designs.
- Q.6 a) Explain in brief the stages in charcoal formation.
b) Explain in brief about design principle and construction details of Box type solar cooker.
- Q.7 a) Describe process of briquetting and explain in brief pellet press.
b) Explain energy saving techniques in farming operations.
- Q.8 a) Explain the principles of energy conservation.
b) State main applications of solar air heaters.

(P.T.O.)

- Q.9 a) Explain operation of Hydroelectric power plant.
b) Explain in brief about the construction and working principle of solar still.
- Q.10 Write short notes (Any Two) :
a) Bio diesel Preparation
b) Applications of OTEC
c) Performance characteristics of wind mills.

SECTION "B"

- Q.11 a) Give the answer in one sentence.
- 1) Which type of material is used for rotor of Sail type of wind mill?
 - 2) State Tip speed Ratio in case of wind machine.
 - 3) What is the calorific value of biogas?
 - 4) What is the maximum theoretical conservation efficiency of horizontal axis wind will?
 - 5) What is the requirement of slurry temperature for optimum biogas production?
 - 6) Define Aerogenerator.
 - 7) In which temperature range the mesophilic bacteria in biogas production works?
 - 8) Name the solar drier in which solar radiation does not fall on product to be dried.
- Q.12 Fill in the blanks.
- 1) Savouries rotor requires relatively _____ wind velocity.
 - 2) _____ collectors are generally used for low temperature applications.
 - 3) The micro-organism involved in the production of biogas to the family of _____.
 - 4) In closed cycle OTEC system, _____ is used to vaporize the working fluid.
 - 5) In _____ type gasifier air is introduced at the bottom and acts as a counter current to fuel flow.
 - 6) Pragati type biogas plant is an example of _____ biogas plant.
 - 7) With parabolic disc concentrator type solar cooker, temperature of the order of _____ °C can be obtained.
 - 8) Methane gas is liquefied at a pressure of about _____ kg/cm² and critical temperature of _____ °C.

