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10ME843

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Bio – Mass Energy System

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. ***Missing data may suitably be assumed.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. What is meant by Biomass? What are the various biomass energy sources? Explain with suitable examples. **(08 Marks)**
b. Write short notes on : i) Photosynthesis ii) Energy plantation. **(06 Marks)**
c. Discuss the Energy context of various bio-fuels. **(06 Marks)**

2 a. With the help of flow chart, explain the methods of biomass conversion and the possible products from them. **(10 Marks)**
b. Explain with necessary sketches / block diagram about Pelletization process. **(06 Marks)**
c. What are the advantages and disadvantages of biological conversion of solar energy? **(04 Marks)**

3 a. Explain with necessary sketch / block diagram about the briquetting process. **(06 Marks)**
b. Enumerate few practical thermal application of Bio - Mass. **(06 Marks)**
c. Explain pyrolysis in detail and the various steps and products involved in it. **(08 Marks)**

4 a. Sketch and explain the working of a Gasifier – Engine Generator System. **(08 Marks)**
b. How gasifiers are classified? Explain the working of a down draft gasifier with necessary chemical reactions and sketch. **(08 Marks)**
c. Give the composition of producer gas. Also state its calorific value. **(04 Marks)**

PART – B

5 a. What is meant by Anaerobic digestion? What are the advantages of anaerobic digestion. **(06 Marks)**
b. Draw a neat sketch of a KVIC digester. Explain its construction and working. **(10 Marks)**
c. Name the 8 factors influencing the production of biogas. **(04 Marks)**

6 a. Calculate : i) The volume of biogas digestor suitable for the output of (5) five cows.
ii) The power available. Retention period is 20 days. Temperature is 30^0C , dry matter consumed 2kg/day. Biogas yield is $0.24m^3$/kg. Burner efficiency is 0.6, Methane proportion is 0.8. Calorific value of methane $28MJ/m^3$. Density of dry matter is fluid $50kg/m^3$. **(08 Marks)**
b. Explain the method of producing ethanol from wood and sugarcane with the help of a block diagram. **(08 Marks)**
c. What are the modification to be made in an engine using ethanol as alternate on fuel? **(04 Marks)**

7 a. Discuss the method of production of Bio – diesel with the necessary reaction involved. Enumerate the factors affecting Bio-diesel production. **(12 Marks)**
b. Enumerate the effects (at least 6) of the use of Bio – diesel in IC engines. **(03 Marks)**
c. What is meant by GASHOL? What are its constituents? **(05 Marks)**

8 a. What are the thermodynamic cycles involved in Bio – Power generation? **(02 Marks)**
b. With a neat T – S diagram, P – V diagram, explain the working of a Brayton cycle with necessary expressions. **(08 Marks)**
c. With a neat sketch, explain the working of a MSW plant and state the Thermo – dynamic cycle in which it works with T – S and P – V diagram, with necessary expressions. **(10 Marks)**

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