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10ME843

Eighth Semester B.E. Degree Examination, June/July 2016
Bio-Mass Energy Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What are the advantages & disadvantages of biomass energy? **(06 Marks)**

b. Define pyrolysis and explain the process in brief. **(08 Marks)**

c. Define photosynthesis. Explain the conditions necessary for maximizing the process. **(06 Marks)**

2 a. What is producer gas? Explain with a diagram its application in engine system. **(08 Marks)**

b. What is energy farming? Mention its advantages. **(06 Marks)**

c. Define gasifier. Classify the different types of gasifiers and its application. **(06 Marks)**

3 a. Define palletization and Briquetting. **(06 Marks)**

b. What is the role of bio-mass conversion technologies? Explain in brief various processes involved for converting bio-mass into premium fuel. **(08 Marks)**

c. What are the advantages and disadvantages of bio-logical conversion of solar energy? **(06 Marks)**

4 a. Describe with a neat sketch the working principle and operation of cross-draught gasifier. **(08 Marks)**

b. Define gasification and liquefaction and explain liquefaction through pyrolysis. **(06 Marks)**

c. Explain the salient features of fluidized bed gasifier and advantages and disadvantages. **(06 Marks)**

PART – B

5 a. Differentiate between fixed dome and floating drum bio-gas plant. **(06 Marks)**

b. Calculate : i) Volume of bio-gas digester suitable for the output of 5 cows and ii) Power available from the digester. If the retention time is 20 days, temperature 30°C, dry matter consumed per day = 2 kg, bio-gas yield is 0.24 m^3/kg, efficiency of the burner is 60%, methane proportion is 0.8, heat of combustion of methane is 28 MJ/m^3 and density of dry matter is 50 kg/m^3. **(08 Marks)**

c. Define fermentation? Discuss in brief different stages involved for producing bio gas. **(06 Marks)**

6 a. Discuss with a neat sketch Brayton cycle and explain in brief the P-V diagram and T-S diagram. **(06 Marks)**

b. Explain with a line diagram the biomass co-generation plant for producing steam. **(08 Marks)**

c. What are the parameters required for electricity production from bio-mass? **(06 Marks)**

7 a. Explain with a line diagram the ethanol production from wood by acid hydrolysis. **(08 Marks)**

b. Discuss in brief different techniques used for pre-treatment of ligno cellulose material. **(06 Marks)**

c. "Methanol as an alternative fuel". Justify this statement and its advantages over other fuels. **(06 Marks)**

8 a. What is bio-diesel and why we need it? **(06 Marks)**

b. Define transestrification? Explain the processes involved in brief. **(08 Marks)**

c. What is the importance of bio-diesel in present situation? **(06 Marks)**

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