Centre for Energy Studies

BIOCONVERSION & PROCESSING OF WASTES, ESL-732

Time : 2 hrs. **(MAJOR TEST)** **MM : 45**

Attempt all questions

1. a) Name two major 'Alcohol fuel' programmes for running an engine. (1)

   b) Discuss 'enzymatic hydrolysis' of starch in biomass (2)

   c) What are the problems involved in conversion of ligno cellulosic materials into ethanol? Describe briefly the 'steam explosive defibration technique'. (3)

   d) It appears that most of the energy of sugar is retained in fermentation process in the form of ethanol. Justify. (1)

   e) The fermentation yield of ethanol from sugar, in practice, is found to be nearly 46% by wt. Compare this yield with the theoretical yield giving reason. (2)

   f) How does sugar content affects the yield of fermentation? (2)

   g) Explain the role of benzene in production of anhydrous ethanol. (3)

2. a) Describe the following two systems:
      i) Anaerobic contact digester
      ii) Anaerobic filter digester (4)

   b) No methane digester operates in the 40-45°C temperature range. Give reason. (2)

   c) Discuss the advantages of operating the anaerobic digestion process below and beyond the above temperature range. (2)

   d) Suggest various options to control movement of methane in a completed landfill. (2)

3.a) With the help of a neat diagram give a brief description of BOM process with special emphasis giving on catalyst recovery and syn gas production. (6)

   b) Discuss the effect of temperature, solvent and reducing gas on the process of carboxolysis of biomass. [6]

4. Write brief notes on the following :

   a) Hydropulper
   b) Interrelationship between the functional elements of MSW management
   c) Fixed carbon and total carbon content of biomass wastes (9)