Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**
P2PRCC08

2nd Semester Regular Examination 2016-17
ENERGY GENERATION FROM WASTE

BRANCHES: ELECTRIC & ELECTRONIC ENGG (POWER SYSTEM ENGG), ELECTRICAL AND ELECTRONIC ENGG, ELECTRICAL ENGG., ELECTRICAL POWER SYSTEM, ENERGY SYSTEMS ENGG, POWER AND ENERGY ENGG, POWER ELECTRONIC, POWER ELECTRONIC & DRIVES, POWER ELECTRO AND ELECTRICAL DRIVES, POWER ELECTRONIC AND POWER SYSTEMS, POWER ENGG AND ENERGY SYSTEMS, POWER SYSTEM ENGG, POWER SYSTEMS

Time: 3 Hours

Max Marks: 100

Q.CODE:Z810

Answer Question No.1 which is compulsory and any FOUR from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: ***Short answer type*** **(2 x 10)**

- **a)** Define Composting. What are the basic functions of composting?
- **b)** What are the resources of biomass?
- **c)** What are the sources of solid waste in a community?
- **d)** Differentiate between producer gas and biogas.
- **e)** Write the water balance equation used to assess leachate formation.
- **f)** What is the composition of urban waste?
- **g)** Define briquetting and what are the benefits derived from its utilization?
- **h)** What are the types of landfills?
- **i)** Define pyrolysis and what are the fuels derived from it?
- **j)** What is alcoholic fermentation?

Q2 **a)** What is incineration? Describe briefly types of solid waste incinerators. **(10)**
b) Differentiate between incineration and gasification. **(10)**

Q3 **a)** Solid waste management is a complex process. Justify with appropriate examples and issues related to it. **(10)**
b) Discuss the relationship between the management options comprising integrated waste management. **(10)**

Q4 **a)** Discuss working operation of MSW to energy incineration plant. In an incineration plant 6000 tonnes per day of waste of calorific value 6 $MJkg^{-1}$ is burnt to raise steam for entry to a Rankine Cycle. Calculate the generated power if electricity is generated at 40% efficiency? **(10)**
b) Status of technologies for generation of Energy from Waste in India. **(10)**

Q5 **a)** What are the factors affecting biogas production? Differentiate between floating drum type and fixed dome type biogas plants. **(10)**

b) Calculate the volume of a fixed-dome-type biogas digester for the output of five cows. Also calculate the thermal power available from biogas. Use the following data: Retention time=40 days, Dry matter produced= 2kg/day/cow, Biogas yield= 0.22 m^3/kg of dry matter, Percentage of dry matter in cow dung= 18%, Percentage of digester volume occupied by the gas= 15%, Density of slurry= 1090 kg/m^3, Burner efficiency= 60%, Heating value of biogas= 23MJ/m^3. **(10)**

Q6 **a)** Discuss generation, composition and utilization of landfill gases. **(10)**

b) What are the methods used for the landfilling of MSW? With the help of flow chart show landfill approval regulatory process. **(10)**

Q7 **a)** Describe the working of different types of gasifiers? **(10)**

b) Discuss the methods used for control of LFG.How environmental monitoring system is applied for landfill gases. **(10)**