Code No: 5221AN

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech II Semester Examinations, February - 2017
COMBUSTION AND ENVIRONMENT
(Thermal Engineering)

Time: 3hrs
Max.Marks:75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Explain the process of Carbonization. [5]
 b) Define order of reaction. [5]
 c) Differentiate enthalpy and enthalpy of formation. [5]
 d) Mention the factors that affect burning velocity. [5]
 e) Discuss the applications in emission control of combustion products. [5]

PART - B

5 × 10 Marks = 50

2. Briefly explain coalification process with schematic diagram. [10]

OR

3. Explain the following physical properties of coal.
 a) Porosity
 b) Moisture content. [5+5]

4.a) Determine Zeroth, first, second and third order reactions.
 b) Explain the General oxidation behavior of hydrocarbons. [5+5]

OR

5. Explain the combustion of CH_4 and air with Combustion stoichiometric relations. [10]

6.a) Differentiate endothermic and exothermic reactions.
 b) Determine the equilibrium composition of methanol and air gaseous mixture. [5+5]

OR

7. Explain with a neat diagram the relationship between adiabatic flame temperature and mixture fraction. [10]

8. Explain with schematic view the comparison of temperature and reaction-rate distributions in premixed gaseous flames and a spray combustion flame in a one-dimensional model. [10]

OR

9. Mention set of equations to explain the production of turbulence by the turbulent flame and to calculate of the intensity of flame generated turbulence. [10]

10. Give a detailed description of droplet ballistic type of model of air pollution. [10]

OR

11. Explain the following terms:
   a) Coal pyrolysis rates
   b) Char oxidation rate. [5+5]

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