Code No: 5121K

R13

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

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5 × 4 Marks = 20

1.a) Explain the advantages of pulverized coal firing. [4]
b) Explain the combustion of fuels. [4]
c) What is stoichiometric or chemically correct ratio? [4]
d) Name the various factors affecting the flame speed. [4]
e) What are particulates? Describe in detail how particulates emissions are caused. [4]

PART - B

5 × 8 Marks = 40

2. How coal is classified? Explain the composition of coal. [8]

OR

3. Explain the significance of viscosity of liquid fuels with the support of numerical Values. [8]

4. Determine the flue gas analysis and air-fuel ratio by weight when a medium viscosity fuel oil with 84.9% carbon, 11.4% hydrogen, 3.2% sulphur, 0.4% oxygen and 0.1% ash is burnt with 20% excess air. Assume complete combustion. [8]

OR

5. What is natural gas? What are the advantages and disadvantages of using natural gas as alternate fuels? [8]

6. Explain Enthalpy of formation. [8]

OR

7. What are the combustion reactions? How do the particulates form in combustion? [8]

8. Define burning velocity. Explain the factors affecting the burning velocity. [8]

OR

9. Explain about the three flame regimes in a turbulent flame. [8]

10. How can emissions be reduced using chemical methods? [8]

OR

11. What are the basic elements exhausted with the flue gases which are hazardous for human health? What are the effects of SO_2, NO_X and Hydrocarbons on the human lives? [8]

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