

**SIXTH SEMESTER B.TECH DEGREE EXAMINATION
(2013 SCHEME)**

13.606.3 FIRE SCIENCE AND INDUSTRIAL SAFETY (N)

TIME: 3 Hrs.

Max. Marks: 100

PART A (*Answer all questions. Each question carries two marks*)

- 1) Distinguish between Explosion and Combustion.
- 2) Explain about Auto Ignition of fuels.
- 3) What are the ignition sources?
- 4) Distinguish between Premixed and Diffusion flames.
- 5) Explain about Pool Fire
- 6) Explain about fire plumes.
- 7) What are the importances of Fire Detection Systems?
- 8) Explain about Static Electricity?
- 9) Explain the importance of considering safety in design.
- 10) Why Pressure Relief Systems are required?

PART B (*Answer any one full question from each module*)

MODULE I

- 11) The products of partial combustion of n-pentane (C_5H_{12}) were found to contain CO_2 and CO in the ratio of 4:1. If the heat of combustion of C_5H_{12} and CO are -3259 kJ/mol and -283 kJ/mol respectively. If the only other product is H_2O , calculate
- a) Heat produced per gram of C_5H_{12} consumed.
 - b) Heat released per gram of air consumed.
- 12) a) Explain about the flammability characteristics of liquids and vapours. **(15)**
b) Calculate the adiabatic flame temperature for the stoichiometric n-pentane – oxygen and stoichiometric n-pentane - air mixture initially at 25^0C . Assuming that dissociation does not occur. **(5)**

MODULE II

- 13) a) Give brief note about the effect of enclosure in fire development. **(10)**
b) What are the critical aspects of fire dynamics? **(10)**
- 14) a) Explain about production and movement of smoke. **(10)**
b) Explain about fire spread through solid medium. **(10)**

MODULE III

- 15) a) Explain about the design of Sprinkler system. *(10)*
b) What are the different methods to extinguish fire? *(10)*
- 16) a) What are the control techniques used to prevent static electricity? *(10)*
b) Explain about flame arrestors. *(10)*

MODULE IV

- 17) a) What are the relief design considerations? *(10)*
b) Explain about major types of relief devices. *(10)*
- 18) a) Explain about Deflagration venting for dust and vapour explosion. *(10)*
b) Explain about venting for fires external to pressure vessel. *(10)*