UPES

Roll No: ----------

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program: B. Tech-FSE | **Semester – IV**
Subject (Course): Fire Engineering-I | **Max. Marks : 100**
Course Code : FSEG 201 | **Duration : 3 Hrs**
No. of page/s:

I. Answer the following: **[20 Marks]**

1. Expand and define the following: [10]
   a. AR-AFFF
   b. MAP powder
   c. VCE
   d. MVWSS
   e. AFPS
2. Fire point of coal is_____ [1]
3. Name the flammability property that exists for solids, liquids and gases. [1]
4. Define 'Expansion' of foam and give the classification of foam based on expansion ratio. [1 +1]
5. The elements in "Dust Pentagon" are Fuel, Heat/Ignition Source, Oxidizer, _____ and _____. [2]
6. A combustible liquid is _____ and flammable liquid is_____ [2]
7. Name any four foam agents used in firefighting. [2]

II. Answer the following: **[40 Marks]**

8. What is 'Fire Load '? Give the classification of buildings based on occupancy and fire load, as per NBC, 2016. [2+4+2]
9. List the specifications of wet and dry riser systems as per NBC, 2016. [4+4]
10. Sprinkler bulbs are given with various colors for ease of recognition. Elucidate about the color-coding of fire sprinkler systems, with specifications and applications. [4 +4]
11. Give the classification of liquids based on their flammability and brief the effect of surrounding conditions on flammability properties of a liquid. [3 +5]
12. Explain how DCP and CO_2 extinguish the fire. Name various DCP agents used in fire service. [4+4]

[Or]

13. Give the detailed classification of HC storage tanks, with examples and mention code of reference. [8]

III. Answer any two of the following: **[40 Marks]**

14. Expand and define BLEVE. Explain the causes, process of occurrence and aftermath effects of BLEVE on a flammable liquid storage tank. [1+2+4+6+7]

15. Compartmentation is the process of segregating various areas in built spaces (buildings) with fire resistant barrications. Doing so leads to limit the extent of fire to a particular area and prevents the fast escalation. However, if conditions are favorable this may lead to local overheating and fire may go out of control. Explain the stages of compartmental fire growth and associated fire detectors with necessary sketches. [10+10]
16. A fire extinguisher has the following name plate details:

Explain the following details from figure:

a. The classes of fires for which it is suitable [3]
b. Size of fire in each class [6]
c. Standard by which it could have been certified [1]
d. The operation of extinguisher, assuming it as cartridge stored pressure type [6]
e. The steps in usage of this. [4]

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Semester	:	**IV**					
Name of the Subject (Course)	:	**Fire Engineering-I**					
Course Code	:	**FSEG 201**					
Name of Question Paper Setter	:	**V Venkata Krishnakanth**					
Employee Code	:	**40001121**					
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I. Answer the following: **[30 Marks]**

1. Expand and define the following: [10]
   a. FFFP
   b. ABC powder
   c. BLEVE
   d. HVWSS
   e. RSFPS
2. Fire point of solidified coal-tar is_____ [1]
3. Name the flammability property that exists for liquids and gases. [1]
4. Define 'Expansion' of foam and give the classification of foam based on expansion ratio. [1 +1]
5. The elements in "Life Cycle of Fire" elements are Fuel, Heat/Ignition Source, Oxidizer, Chain Reaction, _____ and _____. [2]
6. A combustible liquid is _____ and flammable liquid is_____ [2]
7. Name any four foam agents used in firefighting. [2]

II. Answer the following: **[40 Marks]**

8. Explain the working of Deluge sprinkler system, along with its procedure of restoration. [6+2]
9. Expand and define VCE. Explain the process of occurrence and aftermath effects of VCE on a flammable liquid storage tank. [1+1+3+3]
10. Brief about wet and dry barrel hydrant systems along with applications. [4+4]
11. Sprinkler bulbs are given with various colors for ease of recognition. Elucidate about the color-coding of fire sprinkler systems, with specifications and applications. [4 +4]
12. Give the classification of petroleum products based on their flammability and brief the effect of surrounding conditions on flammability properties of a liquid. [3 +5]

[Or]

13. Define "Fire Load". Discuss the classification of buildings based on fire load as per both NBC, 2016 and NFPA 13.

III. Answer the following: **[40 Marks]**

14. Passive fire protection is an important part of fire protection system installation of an oil & gas industry, without which it will not, gives completeness to fire protection. Explain the significance of 'Fire Proofing' and as a fire protection system designer, how will you decide the extent of fire proofing for an O&G industry? [5+15]

17. A fire extinguisher has the following name plate details:

Explain the following details from figure:

f. The classes of fires for which it is suitable [3]
g. Size of fire in each class [6]
h. Standard by which it could have been certified [1]
i. The operation of extinguisher, assuming it as cartridge stored pressure type [6]
j. The steps in usage of this. [4]

16. Fires in hydrocarbon storage tanks are one of the most dangerous occurrences that may end up with devastation. Hence, proper care must be taken to prevent/mitigate them. Give the classification of hydro carbon storage tanks and discuss fire protection system suitable for non-fixed roof tank systems. [8 +12]