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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2017

Program: B. Tech- FSE   Semester – V
Subject (Course): Fire Engineering-II   **Max. Marks   : 100**
Course Code   : FSEG 301   **Duration   : 3 Hrs**
No. of page/s: 2

Section-A: Answer the following in one word: **20* 1 = 20 marks**

1.   The type of centrifugal pump used as jockey pump is_____
2.   The primer that works on venturi principle is _____
3.   Hose that is used for drafting water from ponds, lakes and/or any water body containing coagulant solids is _____
4.   The nozzle used for warehouse firefighting is_____
5.   Stream of capacity of 150gpm coming out of a 100' long 2.5" hose. Calculate frictional loss as per Under Writer's method.
6.   The equation for calculation of max. discharge out of a hose-nozzle combination is_____
7.   Closed circuit SCBA is used in case of _____
8.   Flashover means_____
9.   Venting out smoke and other gases by applying water jet/spray is known as "Spray Ventilation" [T/F]
10. Tool used for vehicular extrication is_____
11. The label used on ladders to sense/show thermal exposure of fire service ladder is _____
12. The safe angle for ladder usage is
     a.   Π rad   c.   75°
     b.   0.5 Π rad   d.   None of the above
13. The standard for Fire Apparatus is _____
     a.   NFPA 1991   **d.**   All the above
     b.   NFPA 2005   **e.**   None of the above
     c.   OISD GDN 115
14. The tool used to shear lock cylinder is
     a.   A-tool   c.   K-tool
     b.   B-tool   d.   J-tool
15.   The tool that can be used as cutting, prying and striking is
     a. Flat headed axe
     b. Pick headed hammer
     c. Normal axe
     d. Key-hole hammer
16. The breaking strength of technical rescue rope is greater than general purpose life safety rope [T/F]
17. Defensive strategy in interior attack means_____
18. ACFT is acronym of_____
19. Master Stream is of _____ (capacity)
20. Which of the following is a secondary knot?
     a. Figure-8 knot   **c.**   Half hitch
     b. Figure-8 knot with bight   **d.**   Safety knot

1. Brief classification of ropes used in fire services and postulate their maintenance procedure
                                                                           [4+4]

2. State the mathematical equation to calculate PDP. Calculate PDP in psi(g) for the following case:

   A fire apparatus is supplying a portable monitor (whose nozzle is 0.5m vertically off from ground level) delivering solid stream of 500GPM through a 10m long 3" hose. The angle of inclination of monitor is 45º and reach of stream is 20 meters, aiming to put off a structural fire. Consider the losses in couplings, fittings and appliances as 2 bar(g).   [1+7]

3. Discuss in short about various types of tools used in forcible entry and ventilation. **[6+2]**

4. Explain various personal protection equipment's to be used by firefighter.   **[8]**

5. Write a short note on various types of firefighting nozzles and associated streams used in fire service for various purposes, with applications and limitations.   **[4+4]**

(OR)

6. Brief about various types of hose lays. Also, differentiate between water relaying and shuttling.   **[6+2]**

Section-C: Answer any two of the following: **2 *20 = 40 Marks**

1. Fire service departments deal with all sorts of incidents incl. natural emergencies. It's crucial to collect proper information and decide right course of action. **If you're a fire commander:**

   a. Assume you have been notified about fire incident in a nearby hospital midst of a busy street, enlist & explain various concerns in deciding right course of action
                                                                           [4+10]

   b. give a brief sketch of plan of action in response to this.   [6]

2. Discuss the working of "Exhaust Jet Primer" and "Reciprocating Primer".   [10+10]

3. Discuss in detail about various kinds and means of ventilation, along with considerations and limitations of each.   [10 +10]

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Section-A: Answer the following in one word: **20* 1 = 20 marks**

1. The PD pump used in case of viscous liquids is_____
2. The pump that converts rotational K.E into pressure is_____
3. Hose that is used for drafting water from ponds, lakes and/or any water body containing coagulant solids is _____
4. The nozzle used for coal bunker firefighting is_____
5. Stream produced out of monitor is _____
6. The equation for calculation of NRF is _____
7. SCBA is acronym of _____
8. Backdraft means_____
9. Venting out smoke and other gases by applying water jet is known as "Spray Ventilation" [T/F]
10. Ladder that can be used both as straight and foldable manners is_____
11. The label used on ladders to sense/show thermal exposure of fire service ladder is
    _____
12. The safe angle for ladder usage is
    a. Π rad   c. 75°
    b. 0.5 Π rad   d. None of the above

13. The hand protection used for handling of high temperature objects is_____
    a. Leather gloves
    b. Canister Gloves
    c. Chemical Gloves
    d. Any of the above
    e. All the above
    f. None of the above
14. The tool used to shear lock cylinder is
    a. A-tool   c. K-tool
    b. B-tool   d. J-tool
15. The tool that can be used as cutting, prying and striking is
    a. Flat headed axe
    b. Pick headed hammer
    c. Normal axe
    d. Key-hole hammer
16. The breaking strength of general purpose life safety rope is 340 KN   [T/F]
17. Defensive strategy in interior attack means_____
18. ACFT is acronym of_____
19. GVWR is defined as_____
20. Which of the following is a secondary knot?
    a. Figure-8 knot   c. Half hitch
    b. Figure-8 knot with bight   d. Safety knot

<u>**Section-B:**</u> **Answer the following:**   **5 * 8 =40 Marks**

1. Brief classification of ladders used in fire services and postulate their maintenance procedure. [4+4]
2. State the mathematical equation to calculate PDP. Calculate PDP in psi(g) for the following case:
   A fire apparatus is supplying a portable monitor (whose nozzle is 0.5m vertically off from ground level) delivering solid stream of 500GPM through a 10m long 3" hose. The angle of inclination of monitor is 45⁰ and reach of stream is 20 meters, aiming to put off a structural fire. Consider the losses in couplings, fittings and appliances as 2 bar(g).   **[1+7]**
3. Most of the deaths/fatalities in fire accidents are caused by smoke/toxic gases and firefighters are no exception for this. Explain the methods/procedures followed by fire fighters to prevent fatalities and pros and cons of each of such techniques.   **[6+2]**
4. Explain about various kinds of respiratory aids used by firefighters in various situations. **[8]**
5. Write a short note on various types of firefighting tools used in fire service for various purposes.

(OR)

6. Postulate and brief about various knots and their applications. Also, state the merits and demerits of knotting.   **[2+4+2]**

<u>**Section-C:**</u> **Answer any two of the following:**   **2 *20 = 40 Marks**

1. Fire service departments deal with all sorts of incidents incl. natural emergencies. It's crucial to collect proper information and decide right course of action. **If you're a fire commander:**
   a. Assume you have been notified about fire incident in a nearby hospital midst of a busy street. Enlist & explain various concerns in deciding right course of action [4+10]
   b. Give a brief sketch of plan of action in response to this.   [6]

2. Fire pump is an essential part of Fire service. Various international and national standard making bodies provide us with different design specifications and performance requirements for the same. Among them mostly accepted standard globally is NFPA 20. It defines, classifies and specifies about fire pumps, according to their feasibility.
   a. Explain how fire pump is different from a domestic water supply pump. [2]
   b. Give various classifications of fire pumps.   [6]
   c. Justify the statement with examples: "A single primer doesn't fit for all types of pumping systems used in fire service"   [4]
   d. Give the maintenance procedure of ropes and ladders.   [4 +4]
3. Give specifications of pumper and aerial apparatus acc.to NFPA.   [10 +10]