

**POST GRADUATE DIPLOMA IN FIRE SAFETY  
AND DISASTER MANAGEMENT  
(PGDFSTYDM)**

**Term-End Examination**

**June, 2013**

**MSE-007 : FIRE ENGINEERING SCIENCE**

*Time : 3 hours*

*Maximum Marks : 100*

*Note : (i) Questions are in two parts i.e. Part I & Part II. Part I has two sections ie A & B. Part I (A) is multiple type questions carrying 2 marks each. Part I (B) is fill in the blanks type, carry 2 marks each. Total 40 marks.*

*(ii) Part - II is subjective type. Please attempt four (4) questions. Each carry 15 marks. Total 60 marks. no negative marking.*

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**PART - I**

1. (a) Tick the correct answers : 2x10=20
- (i) How vacuum is created by exhaust ejector primer ?
- (A) By ventury effect
- (B) By atmospheric pressure
- (C) By centrifugal course
- (D) None of the above

- (ii) What is the ideal suction lift to be maintained while conducting pump tests ?
- (A) 0 mtrs
  - (B) 2.5 mtrs
  - (C) 3.5 mtrs
  - (D) 7 mtrs
- (iii) What is the specific heat of water ?
- (A) 1 cal/gm
  - (B) 4.2 cal/gm
  - (C) 4200 cal/gm
  - (D) 42000 cal/gm
- (iv) Water is flowing in 45mm hose at 4 mtr/sec. What is discharge rate ?
- (A) 405 LPM
  - (B) 500 LPM
  - (C) 650 LPM
  - (D) 748 LPM.
- (v) Find out the jet reaction at nozzle working at 4 bar pressure. The diameter of nozzle is 20 mm :
- (A) 151.2 N
  - (B) 201.2 N
  - (C) 251.2 N
  - (D) 301.2 N

- (vi) How many units of current will be consumed for 700W unit at 240V in one month ? (30 days)
- (A) 304
  - (B) 404
  - (C) 504
  - (D) 554
- (vii) Two pumps can empty a tank in 12 minutes. If one pump is capable of empty the same tank in 30 minutes, how much time will another pump take while working alone ?
- (A) 10 minutes
  - (B) 15 minutes
  - (C) 20 minutes
  - (D) 25 minutes
- (viii) Pressure of a gas at  $27^{\circ}\text{C}$  is 10 bar. Find out the pressure of gas at  $127^{\circ}\text{C}$ , if volume is constant ?
- (A) 13.3 bar
  - (B) 18.3 bars
  - (C) 23.3 bars
  - (D) 27.3 bars

- (ix) What term will satisfy to maximum temperature above which a gas cannot be liquified by pressure alone ?
- (A) Auto ignition temp
  - (B) Critical temp
  - (C) Spontaneous ignition temp
  - (D) Boiling point
- (x) Why Halons have been banned ?
- (A) Due GVW
  - (B) Due ODP
  - (C) Due toxicity
  - (D) Due corrosive nature
- (b) Fill in the blanks : - **2x10=20**
- (i) The friction laws will \_\_\_\_\_ if the diameter of hose is doubled.
  - (ii) LPG gas is \_\_\_\_\_ in weight comparing to air.
  - (iii) Force applied to a body is multiplication of mass and \_\_\_\_\_ .
  - (iv) Latent heat of evaporation of water is \_\_\_\_\_ cal/gm.
  - (v) In an ideal gas volume is \_\_\_\_\_ proportional to pressure, if temp. remain constant.
  - (vi) The pressure at the base of water column is directly proportional to temperature, height and \_\_\_\_\_.

- (vii) The chemical reaction in which heat is observed is known as \_\_\_\_\_ reaction.
- (viii) Combustion process in a flame takes place in \_\_\_\_\_ zone of flame.
- (ix) Flammable gas with highest \_\_\_\_\_ is considered as most dangerous for fire.
- (x) If a iron ball is thrown vertically upward at a velocity of  $u$  m/sec, the velocity of ball while returning to ground will be \_\_\_\_\_ .

## PART-II

2. Give short notes on **any three** of the following : 5x3=15
- (a) Gas laws.
  - (b) Boil over, flash over, slope over.
  - (c) Effect of heat on materials.
  - (d) Dust explosion.
  - (e) Electrical hazards and safe guards.
3. (a) Give chemical reaction of following : 8
- (i) Methane gas burning in oxygen.
  - (ii) Dry chemical powder applied on fire.
  - (iii) Production of oxygen from potassium Chlorate.
  - (iv) Reaction of chlorine with ozone.
- (b) What are the reasons for generation of static charge and preventive measures against accidental discharge of current ? 7
4. (a) State the use of Bernoulli's theorem with respect of fluids under pressure. 8
- (b) A rectangular reservoir with dimensions of  $8 \times 5 \times 3$  cu.m can be filled in 100 minutes by 30mm nozzle. If the pump is 50% efficient, find out the brake power of pump. 7
5. How explosives are classified ? State the precautions while attending fires on explosives and fire fighting procedures. 15

6. Water is known as best cooling media. Explain the methods of application of water on fire, the advantages and disadvantages of each method and restrictions in use of water. 15
7. How does heat travels in different materials and what are preventive measures adopted to restrict transfer of heat ? What do you understand by leniar expansion, superficial expansion and volumetric expansion ? 15
8. Describe pressure velocity curve of centrifugal pump. Explain variation in output of pump due to variable suction lift, temperature and density of water. 15
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