

**POST GRADUATE DIPLOMA IN FIRE SAFETY  
AND DISASTER MANAGEMENT**

**(PGDFSTYDM)**

**00892**

**Term-End Examination**

**December, 2012**

**MSE-007 : FIRE ENGINEERING SCIENCE**

*Time : 3 hours*

*Maximum Marks : 100*

- Note :**
1. Questions are in *two* sections i.e. Part I & Part II. Part I has *two* sections ie a & b. Part I (a) is multiple type questions carrying 2 markseach. Part I (b) is fill in the blanks type, carry 2 marks each. Total 40 marks.
  2. Part - II is subjective type. Please attempt *four (4)* questions. Each carry 15 marks. Total 60 marks. no negative marking.

**PART - I**

1. (a) **Tick The Correct Answer.** **2x10=20**
- (i) Practical suction lift is less than the Theoretical lift. Why ?
    - (A) Due Bend Loss
    - (B) Due friction loss
    - (C) Due entry loss
    - (D) All three
  - (ii) When velocity energy is highest in centrifugal pump discharge cycle ?
    - (A) In Volute
    - (B) In delivery Hose
    - (C) In Impellers
    - (D) In branch pipe

- (iii) A current of .25 Amp. is flowing across a bulb at 15 Volts potential difference. Find out the Wattage of bulb :
- (A) 40W            (B) 60W  
(C) 80W            (D) 100W
- (iv) A pump is 50% efficient with brake power of 16 kW and working at 4 bars pressure. Find out discharge rate.
- (A) 1200 LPM  
(B) 1600 LPM  
(C) 2400 LPM  
(D) 3200 LPM
- (v) The pressure of gas in a cylinder went upto 17 bars after being heated upto 67°C. Find out the original pressure of gas at 27°C :
- (A) 10 bars        (B) 15 bars  
(C) 07 bars        (D) 05 bars
- (vi) What term will satisfy to a minimum Temperature at which flammable Vapours are given by combustible material to be ignited on application of a naked flame.
- (A) Flash Point  
(B) Ignition Temp  
(C) Auto Ignition Temp  
(D) Spontaneous Ignition Temp.

- (vii) Which principle is satisfied by Carbon - di - Oxide ( $\text{CO}_2$ ) gas when applied on fire.
- (A) Cooling
  - (B) Starvation
  - (C) Smothering
  - (D) Chain Inhibition
- (viii) A Swimming pool is 10 meters long and 7 meters wide. The pool is full of water and contains 2,50,000 ltrs water. If deep end is 5 meters. below, find out the depth of shallow end approximately :
- (A) 1 meters    (B) 2 meters
  - (C) 3 meters    (D) 4 meters
- (ix) How much heat will be required to melt 10 gm of ice at  $-10^\circ\text{C}$  and to convert it into water at  $10^\circ\text{C}$  :
- (A) 800 Cal.
  - (B) 1000 Cal.
  - (C) 1200 Cal.
  - (D) 1500 Cal.
- (x) What is the lower limit of flammability of L.P.G gas :
- (A) 1.5%            (B) 2.5%
  - (C) 9%              (D) 9.5%

- (b) Fill in the blanks : 2x10=20
- (i) A temperature reading of  $50^{\circ}\text{F}$  is equal to \_\_\_\_\_ Kelvin.
  - (ii) If the diameter of a nozzle is doubled, the discharge rate will be \_\_\_\_\_.
  - (iii) Heat required to convert water into steam without change of Temperature is known as \_\_\_\_\_ heat of \_\_\_\_\_.
  - (iv) 1 ltr. of Kerosene weighs 850 gm. The specific gravity of Kerosene will be \_\_\_\_\_.
  - (v) A body must possess energy to move so that the force generated is more than \_\_\_\_\_.
  - (vi) Best cooling effect with water can be achieved if applied in \_\_\_\_\_ form.
  - (vii) In an ideal gas pressure is directly proportional to \_\_\_\_\_ if volume remain constant.
  - (viii) Acceleration due to gravity is \_\_\_\_\_  $\text{m}/\text{sec}^2$ .
  - (ix) The pressure at a nozzle at 20 mtr. height is 3.5 bars. If pressure loss due to friction is .5 bars, the pressure at pump will be \_\_\_\_\_.
  - (x) The volumetric expansion of a container is approximately \_\_\_\_\_ times to linear expansion of metal used in container.

## PART - II

2. Give short notes on *any three* of the following. 5x3=15
- (a) Energy, frictional resistance and acceleration.
  - (b) Newton's law of motion.
  - (c) Chemical inhibition of fire.
  - (d) Friction factor.
  - (e) Time - temperature curve explaining combustion process and decay of fire.
3. (a) A circular tank is to be filled with water with the help of a pump. Find out the time taken to fill up the tank if discharge rate of pump is 11000 ltr. per minute. 8
- (b) Calculate the diameter of a spherical tank that holds 15,000 ltrs. of water when full. 7
4. (a) Give chemical reactions of following : 8
- (i) When steam is passed through red hot coke.
  - (ii) When dry chemical powder decomposes.
  - (iii) Carbon burning in scarcity of oxygen.
  - (iv) When halon is applied on fire.
- (b) What is the effect of heat on material and what principle is followed in transmission of heat ? 7

5. What do you understand by "Flash Over" and "Back drought". Explain in detail the conditions responsible for such phenomenon. What precautions should be taken by fire fighter while dealing with such situations ? 15
6. (a) What is tetra - hydron of fire ? What principles could be derived to extinguish fire to eliminate each component ? Suggest suitable media to accomplish principle. 8
- (b) What do you understand by explosive range of flammable gases ? How can we prevent any gas reaching within this range ? 7
7. What hazards are associated with electrical distribution system and the measures to overcome the affect of hazards ? 15
8. (a) What is Ohms law ? Explain nature of conductors, semi-conductors and insulators. 8
- (b) How static electricity is generated and what are the methods to prevent hazards arising from static discharge ? 7
-