



**FIRE SAFETY MANAGER COURSE  
PRE-ENROLMENT TEST**

**FIRE ENGINEERING SCIENCE**

**OBJECTIVE**

Candidates are required to demonstrate a basic knowledge of fire engineering science and principles.

**SYLLABUS**

**1 Basic Units**

- a. Calculate the areas and volumes of triangles, rectangles and circles.
- b. Define velocity and acceleration.
- c. Illustrate that Force = Mass x Acceleration and that the unit is Newton (N).
- d. Describe that the force of gravity on a mass is called weight.
- e. Define pressure as “force per unit area “ and its unit is Newton per sq metre ( $\text{N/m}^2$ ) or Pascal (Pa).
- f. Illustrate that the alternative unit of pressure is the Bar and that one bar =  $100\,000\text{N/m}^2$  or Pa.

**2 Fluids**

- a. Define density as mass per unit volume.
- b. Define relative density.
- c. Solve simple problems relating to density, mass and volume of liquids.
- d. Describe the significance in specific gravities between liquids such as petrol and water.
- e. Explain the factors which determine the pressure at any point in a liquid as fluid density, depth and surface pressure.
- f. Illustrate that the pressure at any level in a liquid is equal in all direction.

- g. Explain that pressure at any level in a liquid is equal in all direction.
- h. Explain that pressure is independent of the shape of the vessel.
- i. Illustrate that pressure acts in a direction normal to its continuing surface.
- j. Explain that the pressure, due to a column of liquid, depends upon the density of the liquid and the height of the column.
- k. Explain why there is a pressure due to the atmosphere.

### **3 Heat**

- a. Demonstrate the difference between heat energy and other forms of energy , e.g. hydrostatic, electrical, chemical.
- b. Describe the relationship between heat and temperature.
- c. Demonstrate how to convert temperature on the Fahrenheit Scale to temperature on the Centigrade Scale and vice versa.
- d. Explain the meaning of the terms “melting point”, “boiling point” and “freezing point”.
- e. Define the term “joule” as a unit of energy and unit of heat.
- f. Define the following terms:-
  - (1) specific heat capacity
  - (2) latent heat of vapourisation
  - (3) coefficient of linear expansion
- g. Describe conduction, convection & radiation and the media (solids, liquids and gases) in which it may occur and how it may lead to fire spread.

### **4 Electricity**

- a. Identify symbols and units of:-
  - (1) Voltage, potential difference (p.d.) and electro-motive force (e.m.f.) measured in volts (V).
  - (2) Resistance measured in ohms (  $\Omega$  ).
  - (3) Current measured in amperes (A).
  - (4) Power measured in watts (W).
- b. State that energy is measured in Joules (J) or watt-seconds and that the practical “unit of energy is the kilowatt-hour (kWh)”.
- c. State Ohm’s Law and use it to solve simple problems.

## 5 Atoms, Elements and Compounds

- a. Explain the meaning of the terms “atom” and “molecule” and state the relationship between them.
- b. Distinguish between elements, compounds and mixtures.
- c. Identify the elements represented by the symbols:  
H, He, B, C, N, O, F, Na, Mg, Al, Si, P, S, Cl, K, Ca, Fe, Cu, Zn, Br, Pb.

**To pass the pre-enrolment test, candidates have to obtain at least 50% of the total score. The syllabus is based on physics and chemistry subjects at GCE “O” Levels. Candidates can use assessment books relating to these subjects which are readily available in most bookshops.**