

L3C1



THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

**IFE Level 3 Certificate in Fire Science, Operations,
Fire Safety and Management**

Unit 1: Fire Engineering Science ([Y/505/5749](#))

SAMPLE

Instructions to Candidates

1. You **must** record all of your answers in the answer book provided.
2. You must answer **all** questions in the examination paper.
3. The marks available for each question are shown at the end of the end of the question. Questions may be answered in any order. You should follow the instructions provided in the question when composing answers.
4. At the end of the examination, the answer book and this question paper will be collected by the invigilators. You will not be allowed to keep any examination stationery.
5. The time allowed for this examination is **one hour**.

Question 1 - Mathematics

- a) Calculate the capacity of a length of hose of 6 metres in length with a diameter of 90 millimetres. Show all workings?
(4 marks)
- b) Explain the difference between an acute angle and an obtuse angle.
(2 marks)

Question 2 - Mechanics

- a) Explain what is meant by the term “viscosity”.
(1 mark)
- b) One of the properties of liquids is viscosity. State and describe two other properties of liquids at normal temperature and pressure.
(4 marks)
- c) Calculate the momentum of a 5 kilogram object travelling at 12 metres per second. Show all workings.
(3 marks)

Question 3 - Heat and Temperature

- a) In relation to temperature measuring devices describe the principles of operation of thermistors.
(3 marks)
- b) Explain what is meant by specific heat capacity and give an example of a substance with a high specific heat capacity.
(3 marks)
- c) Explain what happens when a gas is heated in a closed container and its pressure increases. Using an example, explain how this can affect firefighting.
(4 marks)

Question 4 – Hydraulics

- a) Define the term jet reaction and state how this is measured. (4 marks)
- b) Calculate the reaction of the water leaving a 25mm nozzle if the pressure is 7 bar. (2 marks)

Question 5 – Chemistry

- a) Explain how a diffusion flame differs from a premixed flame. (2 marks)
- b) Explain the difference between laminar and turbulent diffusion flames and provide an example of each type of flame. (4 marks)
- c) Give two examples of classes of fire where water (other than water mist) would not be an appropriate extinguishing medium and explain why this is the case. (4 marks)

Question 6 - Electricity

- a) The current flowing through an electrical appliance is 3 Amps when it is connected to a 240 Volts supply. What is its resistance? (3 marks)
- b) Describe the four factors that affect the resistance of a circuit. (4 marks)
- c) Explain how static electric charges can occur. (3 marks)