IFE Level 4 Certificate in Fire Investigation

Examiner Report – March 2026

Introduction

Of the 22 candidates that sat this examination, 2 (9%) achieved a pass. The best answered question was 6 with an average mark of 7.6 and the least well answered question was 7 with an average mark of 2.3. A recurring theme across the examination was an apparent lack of engagement with the recommended reading materials. While many candidates demonstrated relevant professional experience, responses frequently lacked the specific technical knowledge and terminology expected at this level. Candidates are strongly encouraged to make full use of the published reading list when preparing for future examinations.

Question 1

You have been tasked to recover a sample of fire debris from a building fire that is believed to contain a hydrocarbon used to accelerate a fire. Detail your considerations, actions and methods relating to the recovery of the sample before it is transported from the scene to a secure store. (20 marks)

Examiner Feedback
Some candidates appeared to focus on identifying the presence of ignitable liquids rather than addressing the question, which specifically required discussion of the recovery, handling, packaging, and storage of fire debris samples.
Stronger responses demonstrated an understanding that the primary objective when recovering debris suspected of containing hydrocarbons is to prevent contamination and minimise the loss of volatile compounds. Higher-scoring candidates discussed the importance of using clean equipment, changing gloves between samples, and avoiding cross-contamination between collection locations. More developed responses also considered the use of control samples and appropriate storage conditions following collection.

Question 2

You have been called to investigate a fire aboard a ferry. Discuss the information you would want to obtain from the vessel's owner/operator regarding its operation both before, and at the time of the fire. (20 marks)

Examiner Feedback
Candidates who achieved higher marks demonstrated an appreciation of the breadth of information that may be obtained from the vessel owner or operator when investigating a fire aboard a ferry.
Credit was available for consideration of matters including ownership and operational history, servicing and previous defects, fuelling arrangements, weather and water conditions, vessel movements, onboard equipment, and the circumstances surrounding the discovery and extinguishment of the fire.

Question 3

'Entrainment' is the process of a fire drawing in cooler air from its surroundings. Explain, in detail, entrainment when considering a fire in the centre of a room, a fire adjacent to a wall, and a fire in the corner of a room. (20 marks)

Examiner Feedback
Marks were available for candidates who demonstrated an understanding of the effect of entrainment on plume behaviour, and how these change depending on where the fire is located.
Marks were awarded for recognising that reduced entrainment results in less cooling and greater flame extension, and for explaining the influence of surrounding surfaces and reflected heat. Candidates are reminded that questions requiring explanation should address all scenarios identified within the question and provide sufficient detail to distinguish between them.

Question 4

a) Using examples, discuss the differences between 'seated', and 'non-seated' explosions. (16 marks)

b) In relation to explosions, briefly describe 'Seismic Effect'. (4 marks)

Examiner Feedback
Credit was given for clear explanations of the differences between seated and non-seated explosions, insofar as seated explosions generally have a single point of initiation, such as high explosives or a pressurised vessel, whereas non-seated explosions do not, such as non-contained gas or dust explosions. More developed responses supported these explanations with relevant examples, including explosives, pressure vessel failures, fuel gases, BLEVEs, dust explosions, and backdraughts, and recognised how the degree of confinement influences the effects produced.
In part (b), successful responses described seismic effect as the transmission of blast-induced tremors through the ground and considered the potential consequences for structures and buried services.

Question 5

a) Explain the following terms:
- *i. Heat of combustion. (3 marks)*
- *ii. Complete heat of combustion. (3 marks)*
- *iii. Effective heat of combustion. (3 marks)*

b) Discuss heat release rate and its effect on a fire's development. (11 marks)

Examiner Feedback
In part (a), stronger responses clearly distinguished between the theoretical total heat available from complete combustion and the more realistic effective heat released under actual fire conditions. Additional marks were available for stating the unit of measurement for each term.
In part (b), candidates were expected to explain heat release rate as a measure of the power of a fire. More developed responses considered its influence on fire growth and related

phenomena such as smoke production, flame height, heat flux, compartment temperatures, and conditions affecting occupant tenability. Additional credit was gained by recognising the importance of heat release rate in estimating flashover and understanding fire development. Candidates are reminded that questions involving fire science terminology require an understanding of the definitions, notation, and units of measurement used within the recommended reading material. Linking these concepts to their effect on fire development will help candidates provide more complete and technically accurate responses.

Question 6

Hydrocarbon gases are often involved in or contribute to fires. Describe in detail the properties of the following commonly encountered hydrocarbon gases.

a) Methane. (7 marks)

b) Propane. (6 marks)

c) Butane. (7 marks)

Examiner Feedback
This was the best answered question on the paper, with many candidates demonstrating a sound understanding of the properties of commonly encountered hydrocarbon gases. Higher marks could be achieved through the use of accurate technical information and detailed descriptions of each gas, including chemical composition, vapour density, boiling point, and flammability ranges.
Candidates who considered a broad range of properties across all three gases and used precise terminology were able to demonstrate the depth of understanding expected at this level.

Question 7

Evidence of melting due to heat or electrical activity is often apparent on electrical conductors following a fire.

a) Describe the damage often found on conductors where electrical arcing has occurred. (15 marks)

b) Describe the contrasting damage typically found on conductors melted by the effects of fire. (5 marks)

Examiner Feedback
This was the least well answered question on the paper, but was answered by the majority of candidates. Higher marks could be achieved through detailed descriptions of the characteristic features associated with electrical arcing and an appreciation of how these differ from conductors damaged solely by exposure to fire.
More marks were available for discussing the localised nature of arcing damage, including features such as arc beads, sharp demarcation lines, localised melting, and associated damage patterns.
In part (b) credit was given for recognising that fire-induced melting typically affects a larger area and may exhibit gradual necking, rounded or tapered ends, the effects of gravity, and less distinct boundaries between damaged and undamaged material. Candidates are

reminded that fire investigation questions of this nature require an understanding not only of the appearance of damage, but also of the distinguishing characteristics that allow different mechanisms to be identified.

Question 8

'Clean burn' is a type of fire pattern encountered by fire investigators. Explain how 'clean burn' patterns occur and discuss their relevance and/or limitations with regard to origin determination. (20 marks)

Examiner Feedback

Higher marks could be achieved through clear explanations of the mechanisms that produce clean burn patterns and an appreciation of their evidential significance and limitations. This includes recognising that clean burn results from sustained flame contact, elevated temperatures, and the movement of hot gases removing soot deposits from surfaces. Additional credit was available for considering the influence of factors such as ventilation, and for recognising that clean burn patterns may occur remotely from the area of origin and cannot therefore be a reliable indicator of where a fire started.