

IFE Level 3 Diploma in Fire Safety and Fire Science

Unit 7 – Fire Investigation

Examiner Report – March 2016

Introduction

This was the first time that this examination was available. 55 candidates sat the examination and 44% of them achieved a Pass.

Candidates performed best on questions 1, 2, 7 and 8 and performed least well on question 6.

Many candidates provided responses that lacked the depth of understanding required at this level. Some candidates failed to read questions correctly and/or did not address the full requirements of the question.

Question 1

- a) *Explain what is meant by the ‘Scientific Method’ of investigating the scene of a fire.(5 marks)*
- b) *Using a diagram, describe the stages of an investigation following the scientific method. (10 marks)*
- c) *Explain what is meant by “forming and testing a hypothesis”.(5 marks)*

Examiner Feedback

Many candidates provided a good response to parts a) and b). They explained the stages of the scientific method correctly and provided good diagrams to support their answer; they also recognised the review process with regards to identifying anomalies and missing information.

Many candidates made errors in response to part c). A hypothesis is a proposed explanation for a phenomenon. Before a hypothesis is formed, it is essential to cross check witness accounts and information gathered against available evidence. All evidence must be recovered, recorded and handled correctly. It is also important to assess all relevant information and review it against the available evidence or data to determine whether the explanation is plausible. All samples collected should be examined and tested to establish whether or not they support the hypothesis. A final hypothesis cannot be determined without due reasoning that is supported by the evidence or data available.

Question 2

- a) *Explain the steps you would take to ensure that a fire scene is a safe working environment for you before entering the scene to conduct an investigation. Outline the factors that you would consider. (10 marks)*

b) *In respect of the building utilities, explain how you would go about making the gas and electrical supplies within the building safe if both had been damaged by the fire.(10 marks)*

Examiner Feedback

Most candidates attempted this question and the majority achieved 8 marks or above. However, few candidates achieved very high marks.

Candidates generally provided a good response to part a) of the question and demonstrated a good knowledge of the risk assessment process. Most candidates correctly identified one or more of the pertinent risks and control measures. Risks included: structural integrity, utility hazards, hazardous gases and post-fire toxic products, biohazards and other hazardous chemicals. Appropriate control measures included personal protective equipment, methods to control and monitor structural instability, controlling access to the site and following emergency procedures.

Responses to part b) were generally less well developed and few candidates attained high marks for this element of the question. Many candidates did not fully explain how fire-damaged building utilities could be made safe and failed to take into account:

- safe practices when dealing with electrical intakes and gas cylinders,
- limiting the use of water,
- keeping crews in attendance for fire cover,
- limiting access to the site and maintaining cordons,
- the use of both testing and detecting equipment,
- the use of utility supply authorities to permanently isolate incoming supplies.

Question 3

a) *Explain what is meant by the 'fire tetrahedron' and explain the component parts of it. Include a diagram and label the parts. (10 marks)*

b) *Explain five factors at a fire scene that might determine the extent of combustion that takes place. (10 marks)*

Examiner Feedback

Candidates that performed well on part a) correctly identified that the component parts of the fire tetrahedron were fuel, oxygen, heat and the chain reaction. Candidates who achieved the highest marks explained clearly what "chain reaction" meant in relation to the combustion process.

There were many poor responses to part b) with candidates often describing the fire patterns left by combustion rather than explaining the factors that would determine the extent of combustion. These factors include: ventilation, fuel loading, type of fuel, compartment dynamics and occupancy/processes within the building.

Question 4

With regard to the investigation of vehicle fires:

a) *Detail potential ignition sources that may be the cause of an accidental vehicle fire. (8 marks)*

- b) *Describe the circumstances that may lead you to suspect that a vehicle fire has been set deliberately. (12 marks)*

Examiner Feedback

Candidates generally performed better on part a) than on part b).

In response to part a) of the question, some candidates correctly identified one or more potential ignition sources within a vehicle that could cause accidental fires, such as:

- exhaust systems and catalytic converters,
- turbo charge units,
- alternators/dynamo/ignition coils and starter motors,
- engine management systems,
- battery and electrical faults,
- careless disposal of smoking materials,
- friction from overheating pulleys, brakes and tyres.

Some candidates incorrectly described fuel loading, such as grease, oil, leaking fuel lines and hydraulic fluid as ignition sources.

When responding to part b) of the question, most candidates failed to identify and describe sufficient circumstances that would lead an investigator to suspect a vehicle fire had been set deliberately. This failing prevented candidates from achieving higher marks.

Question 5

- a) *Explain how you would ensure that electrical wiring damaged in a fire is safe to work on during an investigation. (5 marks)*

- b) *Explain how you would establish whether a fuse is in-tact or has blown during a fire. (5 marks)*

- c) *Late one evening a fire has occurred in a factory where a lighting circuit feeds four external flood lights of different types. The first flood light contains a 500 watt halogen lamp. The second, third and fourth flood lights each contain 400 watt metal halide lamps. The owner has advised that these flood lights are not often all switched on at the same time but on the evening in question they were all left switched on. The circuit is protected by a 10 amp fuse and the cable used was rated 5 amps. The circuit voltage is 240 volts.*

Calculate the total current flowing in the circuit and state whether or not the fuse protecting the circuit was large enough. (5 marks)

- d) *Assuming the fire was caused by this lighting circuit and using the information provided, explain what you think the most likely cause of the fire was and describe the other evidence that may be observed to support this hypothesis. (5 marks)*

Examiner Feedback

Most candidates provided a good response to part c) of the question but candidates generally performed less well on parts a), b) and d).

Some candidates failed to detail how fire-damaged electrical wiring could be made safe. They failed to recognise that localised damage could be safely managed by the isolation of a specific circuit on the fuse board whereas more extensive damage would require specialist isolation by the utility authority isolating the supply externally from the building.

Most candidates correctly answered part c) of the question and calculated the current flowing in the circuit described. Candidates that showed their workings attracted high marks.

When responding to part d) of the question, many candidates omitted to describe the heating effect that would be indicative of an overloaded cable.

Question 6

a) Describe in detail the three types of explosions. (15 marks)

b) Define the terms:

i. Condensed Phase Explosion

ii. Vapour Phase or Dispersed Fuel Explosion (5 marks)

Examiner Feedback

This question was the least well answered question.

Few candidates correctly described the three types of explosion when responding to part a). The three types of explosion are Detonation, Deflagration and Mechanical explosions.

When responding to part b) of the question, many candidates wrongly defined the terms Condensed Phase Explosion and Vapour Phase Explosion.

Question 7

You are called to investigate a building fire. Detail the information that you would consider gathering from the fire brigade crews in attendance at the fire. (20 marks)

Examiner Feedback

Most candidates demonstrated a good knowledge and understanding of the information that should be gathered in the early stages of a fire investigation. Candidates who provided detail (as required by the question) were able to secure high marks.

Some candidates provided only bullet point lists and omitted to include detail. This approach limited the marks that could be attained.

Question 8

a) 'ELBOWS' is an acronym that relates to the established rules for making contemporaneous notes at the scene of an investigation. Outline the rules as defined by the ELBOWS acronym. (8 marks)

b) Identify the information that you would record in contemporaneous notes. (6 marks)

c) *Explain the principles that underpin contemporaneous notes in relation to their future use including any legal obligations relevant to your country. (6 marks)*

Examiner Feedback

Candidates generally performed well on parts a) and b) of the question.

Part c) was poorly answered, with candidates who did not explain the legal obligations surrounding the use of such notes failing to secure many marks.