

IFE Level 3 Diploma in Fire Safety and Fire Science

Unit 7 – Fire Investigation

Examiner Report – March 2019

Introduction

47 candidates sat this examination and half of these candidates were successful in achieving a pass. Of the 24 candidates who passed the examination, 10 secured a D grade, 12 secured a C grade and 2 secured a B grade.

Candidates generally performed best on questions 1, 2, 3 and 7 with the average mark attained on these questions being either eight or nine.

Question 1

- a) *Using a flowchart, state the stages of an investigation following the ‘Scientific Method’.* (10 marks)
- b) *Identify six factors that a working hypothesis must rely on.* (6 marks)
- c) *Explain what is meant by the term “level of confidence/certainty”.* (4 marks)

Examiner Feedback

This question was a popular option for candidates.

Most candidates performed well on part a) of the question and correctly identified the stages of the Scientific Method. However, many candidates struggled with parts b) and c).

Part b) required candidates to identify that a hypothesis must rely on a number of factors other than witness information. Few candidates were able to secure all of the marks available. Marks could have been attained for the inclusion of factors such as scene assessments, fire patterns, forensic evidence, fire dynamics, fire modelling, fire testing, scientific examination, human behaviour, environmental conditions, historical data and professional guidelines and standards.

Part c) required candidates to explain that the level of certainty is opinion-based and entirely dependent on whether a hypothesis is either Probable or Possible.

Candidates will find further information on this subject in the IFE publication, *A Guide to Fire Investigation*, Chapter 2 and in *Kirks Fire Investigation*, Chapter 1.

Question 2

Modern health and safety practice requires that a risk assessment should be carried out before any fire scene investigation is commenced.

- a) *Identify the matters that must be considered as potential hazards. (10 marks)*
- b) *In relation to building utilities, explain what actions and precautions should be considered to mitigate a risk of injury. (10 marks)*

Examiner Feedback

Part a) was usually answered well with candidates correctly identifying potential hazards presented by a fire scene such as structural integrity and stability, hazardous gases, dusts, biohazards, toxic post-fire products, sharps, lone-working and possible aggressive or hostile residents/neighbours and re-ignitions/explosions caused by uncovering smouldering hot spots.

Responses to part b) were often poor as many candidates provided little detail in their responses. Most candidates failed to consider the precautions to be taken when dealing with gas supplies; marks were available for points such as using gas monitoring devices, checking for leaks, being aware of the potential accumulation of gas in low lying areas due to it being heavier than air and the withdrawal of crews until adequate ventilation has taken place. Few made reference to the effects of leaking water supplies.

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 3.

Question 3

With the aid of a diagram, state and explain the four stages/phases of fire development within a compartment. (20 marks)

Examiner Feedback

This was a popular option for candidates and many candidates scored high marks – the average mark achieved for this question was nine.

Most candidates had a reasonable understanding of the four phases of fire development within a compartment. However, some candidates were unable to describe the difference between the Development Phase and Steady State Burning phase. These are distinct different stages of a fire's behaviour and need to be understood.

Most candidates provided a diagram to support their answer; however, some candidates missed the opportunity to score marks for correct annotation of the axis of the graph, showing the correct curve line and including the limit to tenability line at 74 °C.

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 7.

Question 4

- a) *Describe the safety considerations to be aware of when investigating vehicle fires. (10 marks)*
- b) *What questions should the fire investigator ask of the driver and passengers of a vehicle which had been driven or parked prior to a vehicle fire? (10 marks)*

Examiner Feedback

Responses to this question were often poor with few candidates securing more than six marks for their response. Candidates often provided only brief responses and the lack of detail and breadth therefore limited the marks that could be attained.

Few candidates scored high marks for their response to part a). Although candidates often cited safety considerations linked to fuel, broken glass, air bags and toxic gases from smouldering fires (and secured marks for these points), few referenced factors such as the cargo or contents of the vehicle, supplementary restraint systems or vehicle stability.

In responding to part b), candidates often focussed on gathering information related to a potential deliberately-set fire and omitted to consider a vehicle fault. The question steered candidates to vehicle fault in that the driver and passengers of the car were available for the investigator to interview. Examples of the types of questions that could have been asked and which would have secured marks follow:

- How long was the vehicle driven just prior to the fire?
- When was it last fuelled?
- Were there any problems with starting, steering or gearbox operation?
- Were there any unusual smells?
- Did the car overheat recently?
- Were there any noises just before the fire?
- Were there any electrical events – lights coming on, instrument readings surging, controls not working properly?
- Were there any recent repairs?

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 9.

Question 5

- a) *The use of electricity has been determined as the cause of many fires. State the common reasons why electrical equipment, wiring and appliances may start a fire. (8 marks)*
- b) *Describe static electricity and explain how it can be a source of ignition. (12 marks)*

Examiner Feedback

Although this was a popular option for candidates, there were few high scores and the average mark attained for the question was six.

Most candidates responded to part a) by stating the main electrical causes of fire. Few candidates referenced the failure of batteries, lost neutral faults, aluminium wiring and installation issues.

Part b) was often answered poorly with many candidates failing to demonstrate understanding of how static electricity is formed and the conditions necessary for it to be an ignition source.

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 9 and in *Kirks Fire Investigation*, chapter 10.

Question 6

There are a range of methods and sources of information used to determine the point of origin of a fire within a compartment or structure. Identify the fire indicators that should be considered when using each of the following methods.

- a) Time and Temperature Analysis (5 marks)*
- b) Pattern Analysis (5 marks)*
- c) Fire Development Analysis (5 marks)*
- d) Human/Interactive methods (5 marks)*

Examiner Feedback

The question was the least popular option for candidates and those candidates that did attempt the question often provided responses that lacked sufficient detail to score high marks. The average mark attained for responses to this question was six.

Most candidates submitted generic points in relation to the different methods and failed to demonstrate understanding of the differences between them.

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 11.

Question 7

- a) Define the two forms of electrical current, give applications where they are used and describe the effect of electrocution from each. (8 marks)*
- b) With the aid of a diagram, explain how electricity is generated and distributed around the country. (12 marks)*

Examiner Feedback

Responses to this question were generally good with the average mark attained being nine.

Part a) was often answered well with many candidates able to secure all of the marks available for this part of the question. However, some candidates failed to explain the effects of

electrocution from each type of current. Worryingly, some candidates thought that Direct Current did not present an electrocution risk at all.

There were some good responses to part b) with candidates providing appropriate diagrams to support their descriptions of the electrical generation, transmission and distribution process.

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*, chapter 8.

Question 8

Identify the circumstances and observations that may lead you to reasonably suspect that a fire has been deliberately set. (20 marks)

Examiner Feedback

This was a popular option for candidates but few candidates scored eight marks or above for their response.

The main issue for candidates was that they provided brief responses that lacked detail and failed to demonstrate sufficient depth of understanding. Examples of the sorts of points that would have scored marks are as follows:

- Insecure premises.
- Signs of unexplained forced entry.
- Multiple seats of fire.
- Unexplained rapid fire growth in relation to time of first discovery.
- Witness information or CCTV footage of suspicious activity or anti-social behaviour.
- Witness information not matching observed evidence.
- Fire would be financially advantageous.
- Unusually stacked fuel loading.
- Combustibles placed on cooking hobs or close to radiant heat sources.
- Evidence of tampering of electrics.
- Fire protection systems/sprinklers turned off or smoke alarms deactivated.
- Fire doors wedged open to allow fire spread.
- Obstructions or booby traps to hinder firefighting progress.
- Sentimental items removed prior

Further information on this topic is available in the IFE publication, *A Guide to Fire Investigation*.

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