

IFE Level 4 Certificate in Fire Safety and Fire Science

Unit 6 – Fire Investigation

Examiner Report – March 2017

Introduction

Entries for this examination were low with only 60 candidates booking examinations. Performance was, however, in line with previous years with 22% of candidates who sat the examination attaining a Pass.

Candidates generally performed best on question 1 and least well on question 7.

Question 1

The use of electricity has been determined as the cause of many fires.

a) *Explain what is meant by the following terms:*

- i) resistance*
- ii) resistive heating*

(7 marks)

b) *Explain how the natural phenomena of lightning may start a fire and describe the evidence that may lead you to suspect that such an event is responsible. (7 marks)*

c) *Describe the other common reasons why electrical equipment, wiring and appliances may start a fire. (6 marks)*

Examiner Feedback

All of the candidates attempted this question. Around half of the candidates achieved 8 marks or more.

In response to part a), most candidates demonstrated an understanding of electrical resistance and of how resistive heating can result in a fire.

In response to part b), many candidates gave good descriptions of how lightning may initiate a fire; however, few candidates were able to describe the evidence at a fire scene to support to such a cause.

Part c) was also answered well with many candidates demonstrating a good understanding of electricity and how it can lead to a fire

Question 2

The Cognitive Interviewing method can be used when gathering information from witnesses.

- a) Explain what is meant by the Cognitive Interviewing method. (4 marks)*
- b) Describe the structure of a Cognitive Interview. Your description should include each of the stages and a summary of the key elements of the approach at each stage. (16 marks)*

Examiner Feedback

This was a very unpopular option for candidates.

Those candidates that did attempt the question provided only brief responses and few candidates attained more than 8 marks.

Candidates who provided good responses to part b) explained how interviewers conduct themselves (and why this so), how the interview is structured and how it is closed.

Question 3

- a) Given the necessary circumstances the sun can be considered as a competent ignition source. With the aid of an annotated diagram, explain the mechanisms/circumstances required for ignition by the sun to occur. (15 marks)*
- b) The cause of a wildland fire is believed to be due to sunlight focused by a broken glass bottle. Give, and explain, your opinion on this as a viable ignition source. (5 marks)*

Examiner Feedback

There were few good responses to this question.

Despite the explicit requirement in the question to provide an annotated diagram, many candidates omitted to include a diagram. This meant that candidates lost the opportunity to attain the marks allocated for this element of the question. Many candidates appeared to rely on past experiences and existing knowledge and failed to give any real detail as to how the sun can be considered a competent ignition source.

In response to part b), a significant amount of candidates offered descriptions of how wildland fires can start which was not required by the question. All but one candidate failed to answer part b) correctly; candidates should be aware that broken glass is not a competent viable source of ignition.

Question 4

With regards to fatal fires, explain the phenomenon known as the candle or wick effect. (20 marks)

Examiner Feedback

Few candidates provided good responses to this question.

Some candidates answered this question without understanding that the candle or wick effect (in relation to a fatal fire) relates to the way that a body had been affected in a fire. There were many scripts where candidates provided explanations and even diagrams explaining how a candle wick burns. These candidates missed the point of the question and therefore failed to attain marks.

Question 5

Glass is a structural material found in virtually all structures. Describe the properties of glass and explain how its behaviour in a fire can provide a valuable indicator for the fire investigator. (20 marks)

Examiner Feedback

Many candidates were able to state that glass can provide indicators for fire investigators but failed to describe how. Successful candidates were able to give good descriptions of how glass breaks both thermally and mechanically and the resultant fracture lines. Good responses also described soot staining effects, explained the implications of the location of broken glass and gave detailed descriptions of the properties of glass.

Question 6

a) Explain the following terms in relation to the combustion properties of liquids and gaseous fuels:

- i) vapour pressure (10 marks)*
- ii) auto ignition temperature (2 marks)*

b) Explain the term “flammability (explosive) limits” using acetylene as an example. (8 marks)

Examiner Feedback

Many candidates were able to explain the terms ‘auto ignition temperature’ and ‘flammability (explosive) limits’ and provided detailed and accurate descriptions.

However, few candidates were able to adequately describe the term ‘vapour pressure’ and there were many poor answers to this element of the question. Fire Investigators require a good level of understanding relating fire science and candidates should be aware that

vapour pressure is a measure of a liquid's volatility. The higher the temperature, the more liquid will evaporate thus the higher the vapour pressure; the lower the molecular weight, the higher the vapour pressure. Vapour pressure determines how flammable a liquid is.

Question 7

The fire investigator should not overlook the potential of paint applied to surfaces as a source of fuel in a fire. Describe the composition and properties of paint and explain how paint can contribute to a fire. (20 marks)

Examiner Feedback

This question was the most unpopular option for candidates. Those candidates that did attempt this question generally attained only low marks.

It is imperative that fire investigators have an intimate knowledge of how a structure's fittings, fittings and coverings behave in a fire. Many candidates appeared to rely on existing knowledge of paint and how it can contribute to a fire rather than demonstrating in-depth understanding.

Question 8

a) With regards to fires involving electricity, define the term "arcing". (4 marks)

b) "Arc mapping" can be a useful tool for the fire investigator to determine where a fire may have originated. Describe in detail the limitations of this method. (16 marks)

Examiner Feedback

This was a popular option for candidates but few candidates attained high marks

Despite 'arcing' being a commonly used term, many candidates were unable to adequately define the term.

In response to part b), many candidates were able to give an adequate definition of 'arc mapping' but few candidates provided detail pertaining to the limitations of its use. The lack of information on the limitations of the method meant that candidates were unable to attain high marks.