

IFE Level 3 Diploma in Fire Safety and Fire Science

Unit 7 – Fire Investigation

Examiner Report – March 2017

Introduction

There was an increase in the number of candidates opting to take the level 3 Diploma Fire Investigation paper. A total of 67 candidates submitted papers. 57% of the candidates attained a pass.

The majority of candidates that attained a pass, attained a D grade. However, there were a number of excellent scripts and several candidates attained either a B or an A grade.

Candidates generally performed well on questions 2, 5 and 7. They usually performed least well on question 1; performance on this question was particularly disappointing as this is a core subject for those working in fire investigation contexts.

Question 1

Define and briefly explain the characteristics of the following explosive events:

- a) *deflagration (8 marks)*
- b) *detonation (12 marks)*

Examiner Feedback

This question was a popular option for candidates. However, only a third of the candidates that attempted the question attained 8 marks or above.

Many candidates correctly identified the characteristics with regards to the speed of reaction and subsequent pressure waves. However, most candidates neglected to explain the chemistry and development of the events.

Question 2

In relation to electrical safety devices/circuit breakers:

- a) *Describe the physical and operating features of a cartridge fuse and explain the fault conditions that will cause it to activate. (8 marks)*
- b) *Describe the physical and operating features of a miniature circuit breaker (MCB) and explain the fault conditions that will cause it to activate. (6 marks)*
- c) *Describe the physical and operating features of a residual current device (RCD) and explain the fault conditions that will cause it to activate. (6 marks)*

Examiner Feedback

This question was an unpopular option for candidates. About half of the candidates who responded to the question clearly understood the subject area and were able to attain 8 marks or more.

Although most candidates correctly described the physical and operating features of a Cartridge Fuse, many could not identify the difference between a Miniature Circuit Breaker (MCB) and a Residual Current Device (RCD).

Question 3

- 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 how photovoltaic solar panels work and explain the main causes of fires within solar panel systems. (12 marks)*

Examiner Feedback

Responses to part a) were generally good and most candidates correctly identified the main reasons why electrical equipment, wiring and appliances can start fires.

Responses to part b) were often poor. Candidates often provided only very limited information on the operation of photovoltaic panels. Few candidates demonstrated understanding as to the main causes of fire. Examples of causes include damaged cables, faulty manufacture or installation which could be responsible for localised heating, AC Isolators used incorrectly in place of DC Isolators are prone to heating, any ignition source could ignite composite material of panel, cabling or adjacent combustible material.

Question 4

- a) *State the common types of glass and the situations in which the different types of glass can be encountered.(8 marks)*
- b) *Describe the information that can be recovered from examining glass at a fire scene. (12 marks)*

Examiner Feedback

This question was a popular option for candidates and some candidates provided excellent responses.

Part a) was not answered well. Few candidates could state the common types of glass and their uses. The types of glass which should have been covered were Soda or Soda-Lime Glass, Toughened Glass, Borosilicate Glass and glass ceramics.

Responses to part b) were generally good and candidates who attained 8 marks or above for their response to this question generally attained the majority of their marks for their response to this section of the question. Most candidates competently explained the difference between mechanical and thermal damage to glass. Candidates with an in-depth understanding also explained other temperature-related indications and the implications of soot deposition.

Question 5

With regards scene safety:

- a) *Define the relationship between hazards and risks. (2 marks)*
- b) *Explain how risk can be calculated. Include an illustration of a simple risk matrix. (7 marks)*
- c) *The outcome of the risk assessment should provide an indication of the measures needed to manage or control the risk.*
 - i) *State three methods of controlling the risk. (3 marks)*
 - ii) *State eight examples of Personal Protective Equipment (PPE). (8 marks)*

Examiner Feedback

This question was the most popular option for candidates. Responses were generally good with 78% of the candidates that attempted the question attaining 8 marks or above for their response. Candidates generally performed best on part c)ii).

In response to part a), a surprising number of candidates were unable to define the relationship between a hazard and a risk. Few candidates demonstrated understanding of the process to calculate risk when responding to part b).

Part c) was usually answered well as most candidates were able to provide examples of the Personal Protective Equipment (PPE) required by fire investigators. In responding to part c)i), few candidates to correctly identified the risk control methods as Avoiding, Reducing and Removing the hazard.

Question 6

You are investigating a fire scene that is suspected to have been deliberately set. The police have requested that you sample an item of real evidence for further analysis.

- a) Define what constitutes evidence in relation to fire scene evidence (4 marks)*
- b) Explain what is meant by the term “Chain of Custody” which is sometimes known as “evidence continuity”. (6 marks)*
- c) Detail the measures that need to be taken to maintain or preserve the “Chain of Custody”. (10 marks)*

Examiner Feedback

The candidates that performed well in this question generally performed best on parts a) and b) as they were able to fully define evidence in the context of a fire scene and to explain what is meant by chain of custody.

Part c) was not answered well. There were many measures that could have been covered but most candidates identified only one or two measures. Examples of the types of measures that could have been explored include: keeping all evidence under the control of the same person collecting it until placed into storage or handed over for transportation/examination, packaging correctly and appropriately to preserve the evidence and prevent from damage during transportation, storing evidence in a secure location, annotating labels with the name and signature or initials of the person collecting, sampling or seizing the evidence and avoiding the potential for cross contamination.

Question 7

With the aid of a diagram, state and explain the four stages/phases of fire development within a compartment. (2 marks)

Examiner Feedback

This question was another popular option for candidates. Those that answered the question often provided good responses and 67% of the candidates that provided responses attained 8 marks or above.

Candidates that attained good marks for the question correctly identified the stages/phases of fire development as being Incipient, Development, Steady State Burning and Decay. Good scripts included accurate diagrams that depicted the fire development curve.

Some candidates omitted to include the diagram required by the question. Some explanations were also too brief to secure more than a few marks.

Question 8

- a) *Define the term “accelerant”. (4 marks)*
- b) *State the two primary groups of flammable liquids used as accelerants and list the properties that make them efficient first fuels. (6 marks)*
- c) *Explain what is meant by flammability / explosive limits and stoichiometric mixtures. (10 marks)*

Examiner Feedback

Good responses included full definitions of the term “accelerant” along with thorough explanations of the properties that make accelerants efficient first fuels.

In response to part b), some candidates did not recognise that the two types of flammable liquids are hydro carbon based liquids and alcohol or polar solvent based liquids. Many candidates were unable to identify more than one or two of the properties that make them efficient first fuels. These properties are low flash points, low boiling points, the ability to produce sufficient vapour for ignition to occur at ambient temperatures or below, flammability limits broad enough to allow both a lean and rich mix ignition and a heat output sufficiently high enough to ignite the second fuel they are intended to start.

Part c) was often answered poorly as many candidates were unable to fully explain limits of flammability or the term stoichiometric mixtures.