

L4C6



THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

IFE Level 4 Certificate in Fire Science and Fire Safety (HL)

Unit 6: Fire Investigation (T/505/5936)

Friday 13 March 2015

10:15 – 13:15

Instructions to Candidates

1. The time allowed for this examination is **THREE** hours.
2. Candidates are to answer **SIX** questions from the total of **EIGHT** questions set for this examination.
3. All questions carry equal marks and may be answered in any order. Candidates should follow the instructions provided in the question when composing their responses.
4. Candidates should record all of their answers in the answer book provided.
5. The question paper must be handed in with the answer book.

1

- a) Explain in detail static electricity, how it occurs and how it discharges. (8 marks)
- b) Describe the conditions that are necessary for a static arc ignition to be determined as the cause of a fire. (9 marks)
- c) Give three examples of flammable materials that can be ignited by a static electricity arc. (3 marks)
-

2

- a) The fixed mains wiring within a domestic premises can be a potential cause of fire. Detail five faults within the fixed mains wiring that may lead to a fire. (5 marks)
- b) Overcurrent devices within domestic premises can be of importance from a fire investigation stand point. Explain five problems encountered with overcurrent devices that may lead to a fire. (5 marks)
- c) Describe the purpose of a residual current device (RCD)/ground fault circuit interrupter (GFCI) and explain how it works. (10 marks)
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3

With regard to the identification of a fatal fire victim:

- a) Identify the factors that may affect the reliability of a visual personal identification of a fire victim by close friends or relatives. (5 marks)
- b) Briefly describe the more reliable and commonly adopted methods to identify fire victims. (10 marks)
- c) The cause of death can be quite varied in a fire. One of the most common causes is the result of asphyxiation by carbon monoxide. List five other causes of death that may result. (5 marks)
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4

- a) With regard to explosions and explosive combustion, define the following terms:
- i. Explosive (2 marks)
 - ii. Brisance (2 marks)
 - iii. Deflagration (3 marks)
 - iv. Detonation (3 marks)
- b) With the aid of an example, describe an “electrical explosion”. (8 marks)
- c) With regards to dust explosions, name two factors which determine the “explosive/flammability limits” of a particular substance. (2 marks)
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5

- a) “Drop down” is a form of fire damage known to fire investigators.
- i. Describe “drop down” in the context of fire damage. (4 marks)
 - ii. Describe three typical examples of where drop down may occur. (3 marks)
 - iii. Explain the consequences of failing to recognise drop down damage. (3 marks)
- b) With the aid of a diagram, define (with examples) the following terms:
- i. Counter flow flame spread (5 marks)
 - ii. Concurrent flame spread (5 marks)
-

[Please turn over]

6

The nature and degree of damage within a building caused by fire or the products of combustion can be affected by a number of conditions. Describe ten such conditions.

(20 marks)

7

Recording the fire scene photographically plays a vital role in the investigative process. It is often divided into four distinct steps. Describe these steps and explain the purpose of each.

(20 marks)

8

a) Using a lit cigarette and an item of upholstered furniture as an example, describe in detail the following:

i. The process of smouldering combustion (with the aid of a diagram).

(10 marks)

ii. The transition from smouldering to flaming combustion.

(4 marks)

b) What evidence would you look for if you wanted to confirm that a fire had commenced with a period of smouldering in an item of upholstered furniture?

(6 marks)
