

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 17 March 2017

10.30 – 13.30

Instructions to Candidates

1. The time allowed for this examination is **THREE** hours.
2. Candidates must 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.

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)

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)

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)

Question 4

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

(20 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)

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)

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)

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)
