

L4C6



THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

IFE Level 4 Certificate in Fire Science and Fire Safety

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

Friday 9 March 2018

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

Explain the considerations to be taken into account when excavating and removing a body from a fire scene.

(20 marks)

Question 2

a) Explain the conditions required for a stack of hay to self-heat to ignition. (12 marks)

b) Describe the evidence that would indicate a fire in a stack of hay is a result of self-heating as opposed to an introduced ignition source. (8 marks)

(8 marks)

Question 3

a) Describe what is meant by a “plume pattern”. (5 marks)

b) Explain how marks on ceilings and walls may be interpreted. (15 marks)

(15 marks)

Question 4

a) Interviews with witnesses form an important part of any fire investigation. Explain the possible limitations of evidence provided by lay witnesses. (5 marks)

b) The PEACE Method is a system of interviewing that is used by police and fire investigators. Describe the components of this method of interviewing. (15 Marks)

(15 Marks)

Question 5

Explain in detail the effects of both environmental temperature and humidity on fire initiation and development.

(20 marks)

Question 6

The careless handling of cigarettes is widely accepted as one of the most common causes of accidental fires.

a) Explain in detail how a cigarette causes a suitable fuel source to ignite. Use furniture as an example to support your points. (15 marks)

b) Explain why a lighted cigarette is not considered likely to cause the ignition of flammable vapours. (5 marks)

Question 7

Fire Investigators rely on many “indicators” at fire scenes to assist in identifying where a fire may have originated and in which direction it spread once ignited.

a) Describe in detail the properties of gypsum board (also known as plaster board) and explain how the process of “calcination” of gypsum board can assist the fire investigator. (12 marks)

b) Explain the term “annealing” and explain how annealing can be a useful indicator when examining the steel springs of furniture involved in a fire. (8 marks)

Question 8

a) With regards to the structure of flames, explain the following terms:

i) Diffusion and pre-mixed flames. (6 marks)

ii) Laminar and turbulent flames. (6 marks)

b) An integral part of every fire is the transfer of heat, both to the fuel and away from it.

i) Define the term “heat flux”. (4 marks)

ii) Briefly explain the terms “heat” and “temperature”. (4 marks)
