

L3D7



THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

IFE Level 3 Diploma in Fire Science and Fire Safety Unit 7: Fire Investigation (D/507/7414)

Friday 13 March 2020

14.30 – 17.30

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

You are called to investigate a fire involving an extension lead which is supplying an electric heater. The circuit supplying the extension lead is protected by a 16a miniature circuit breaker and the nominal voltage is 230v AC. The measured resistance of the electric heater's element is 17.63 ohms.

- a) Using the correct formulas and showing all working out, calculate:
- i) how much current the heater would draw when in use (correct to 2 decimal places). (4 marks)
 - ii) the power rating of the element. (4 marks)
- b) State the possibility of this fire being caused by an overload of the extension lead and describe the evidence you would expect to find to support this. (12 marks)
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Question 2

With regards to scene examination and excavation techniques, explain the following terms:

- a) layering (4 marks)
 - b) search zone (4 marks)
 - c) reconstruction (6 marks)
 - d) radius of error (6 marks)
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Question 3

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

- a) deflagration (6 marks)
 - b) detonation (10 marks)
 - c) mechanical (4 marks)
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Question 4

- a) Define the term “accelerant”.
(4 marks)
- b) State the two primary groups of flammable/ignitable liquids used as accelerants and list the properties that make them both efficient first fuels.
(6 marks)
- c) Explain what is meant by:
- i) flammability / explosive limits
 - ii) stoichiometric mixtures
- (10 marks)
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Question 5

With regard to the investigation of vehicle fires:

- a) state the potential ignition sources that may be the cause of an accidental vehicle fire.
(10 marks)
- b) describe the circumstances that may lead you to suspect that a vehicle has been set on fire deliberately.
(10 marks)
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Question 6

Fire scenes are inherently dangerous environments for the fire investigator. The degree of risk posed will depend on the amount of damage caused by the fire and the presence of any hazardous materials.

- a) Explain how the dusts present after a fire are a major hazard to the fire investigator and state how they can be controlled.
(6 marks)
- b) Detail and describe the main hazardous dusts that may be present at a fire scene.
(14 marks)
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Question 7

You are called to investigate a building fire. Describe the information that you would gather from the fire brigade crews in attendance at the fire.

(20 marks)

[Please turn over]

Question 8

- a) "ELBOWS" is an acronym that relates to the established rules for the taking of contemporaneous notes at the scene of an investigation. Outline the rules as defined by the ELBOWS acronym. (8 marks)
- b) State the information that should be included when producing diagrams/sketches and explain how diagrams/sketches can be an invaluable part of recording a fire scene. (8 marks)
- c) State the methods other than contemporaneous notes and diagrams/sketches that are available for recording a fire scene. (4 marks)
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