

L3D2



THE INSTITUTION OF FIRE ENGINEERS
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IFE Level 3 Diploma in Fire Science and Fire Safety (VRQ)

Unit 2: Fire Safety (F/505/6006)

Thursday 16 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 answers.
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

- a) State the three component parts of a floor. (3 marks)
- b) Describe one example where all three parts of a floor are separate and one example where all three parts are merged. (4 marks)
- c)
- i) Describe six different ways in which floor joists may be supported at the wall. (6 marks)
 - ii) Explain how any two of these ways would be expected to behave in a fire. (4 marks)
 - iii) Describe three factors that can influence the fire resistance of timber floors. (3 marks)
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Question 2

- a) Explain the effect of applying a load to a simple beam. (4 marks)
- b) Explain the bending moment of a beam. (4 marks)
- c) When used as a beam, explain why concrete needs to be reinforced. (2 marks)
- d) Explain three reasons why steel is used as the reinforcing method. (6 marks)
- e) Explain two main factors upon which the fire resistance of a concrete beam will depend. (4 marks)
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Question 3

- a) Life safety fire alarm systems are automatic fire detection systems intended for the protection of life. Explain the coverage provided by, and objectives of, different types of life safety fire alarm system categories. (10 marks)
- b) Most modern fire alarm systems will incorporate a control panel. Explain five functions the control panel will be expected to perform. (10 marks)
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Question 4

You have been asked to carry out a fire risk assessment on a single storey factory. The factory carries out processes which are loud, involve the use of flammable liquids and require staff to wear personal protection at all times including ear defenders.

- a) Explain the factors that you would take into account in identifying a suitable fire alarm system for the premises (including the system for raising the alarm). (8 marks)
- b)
- i) Explain the risks involved in storing and using flammable liquids. (4 marks)
- ii) Describe the measures you would recommend to reduce these risks to an acceptable level. (8 marks)
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Question 5

Effective management and planning is needed for those with impairments to ensure their safe evacuation from buildings in an emergency.

- a) Explain what is meant by a 'refuge' and describe the features that need to be included in the design of a suitable disabled refuge. (10 marks)
- b) Describe the features you might consider including when designing escape routes and systems to assist visually impaired people to evacuate a building. (6 marks)
- c) What is a Personal Emergency Evacuation Plan (PEEP) and what would a plan of this type normally include? (4 marks)
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Question 6

- a) Describe briefly what an 'atrium' is, as an architectural concept. (2 marks)
- b) Describe the hazards to persons from fire associated with this form of building design. (4 marks)
- c) Identify the four systems that can control or manage smoke from a possible fire situation in an atrium and briefly describe the inherent differences between the four systems. (14 marks)
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[Please turn over]

Question 7

- a) Explain the design of two different types of automatic door hold open/release devices for self-closing fire doors. (8 marks)
 - b) Outline four conditions which would cause the device to operate. (4 marks)
 - c) Explain four advantages of these devices. (4 marks)
 - d) Explain four disadvantages of these devices. (4 marks)
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Question 8

- a) When designing a sprinkler system for a building, occupancies can be divided into different risk categories. State the risk categories. (6 marks)
 - b) Explain the term 'minimum design density' and explain how it relates to the risk categories. (4 marks)
 - c) Sprinkler life safety systems need to be more reliable than basic systems. Explain the requirements of a life safety system which will enhance their reliability. (10 marks)
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