

IFE Level 3 Diploma in Fire Safety and Fire Science

Unit 2 – Fire Safety (Zone 1)

Examiner Report – March 2017

Introduction

Performance was very poor with few candidates demonstrating the in-depth technical knowledge and understanding required to gain marks.

Many candidates took every opportunity to revert to talking about firefighting operations. This approach gained no marks in a fire safety examination. Many candidates seemed to be relying on generic knowledge and firefighting experience rather than on technical knowledge of fire safety.

Candidates generally performed poorly on all questions and the average mark per question across the whole paper was under 6 marks.

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)*

Examiner Feedback

Only a few candidates attempted this question and those that did attempt the question generally performed poorly.

The three component parts of a floor, as required by part a), are the actual loadbearing members, the upper surface or finish of the floor and the lower surface of the ceiling of the compartment below.

Part b) was answered poorly and many candidates appeared to be unfamiliar with this form of construction.

Candidates performed best on part c)iii) as they were able to discuss general fire resistance issues.

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)*

Examiner Feedback

This question was a popular option for candidates but it was not always well answered.

Some candidates included one or more diagrams to support their responses. Although this was not required by the question, candidates who did include a diagram were often able to draw out their points more effectively.

Candidates often omitted basic information eg the load further from support would bend further.

Parts d) and e) were often answered well and the relationship between steel and concrete appeared to be well understood.

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)*

Examiner Feedback

Part a) was often answered poorly. Candidates should be aware that there are five categories of life safety alarm systems.

Candidates should have found part b) straightforward but many candidates appeared to struggle with the question. Some candidates went into technical detail about how alarms work (even including diagrams) but omitted to detail five functions of the control panel as required by the question. Control panels provide many functions and candidates should have been able to describe at least five; examples of functions include: automatically monitoring and controlling the equipment in the system (such as the fire detection and fire alarm device circuits and the power supply to that equipment); indicating fire and fault

signals and their location; providing manual control facilities for testing the circuit, triggering fire alarm signals, silencing audible fire warnings and resetting the system after a fire signal; and operating the alarm either throughout the building or in any particular sequence related to an evacuation plan for the building with manual override facilities as necessary.

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)*

Examiner Feedback

This was a popular option for candidates and some candidates were able to provide good responses.

Responses to part a) were often poor. Candidates usually identified that the alarm would not be audible in the context and so a visual alarm would be needed in addition to a standard alarm. However, few went on to explore the issues in detail eg a visual alarm will need to be clearly seen by all of those in the affected area and will need to be of a colour, brightness and effect that will catch occupants' attention and be specific to the fire alarm. Some candidates correctly identified that the simplest system for raising the alarm would involve a manual system with break glass points at each exit.

Candidates generally performed well on part b). However, many candidates focused on fighting fires involving flammable liquids rather than on managing risks. The types of control measures that could have been covered included: strict management of disposal of waste, separation and segregation of incompatible substances, limitation of quantities within workplace (up to 50 litres), use of fire resisting cabinets, maintaining distance and separation from ignition sources and ventilation of storage areas preventing accumulation of flammable vapours.

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)*

Examiner Feedback

Most candidates were able to explain what is meant by a 'refuge' but few mentioned that persons in a refuge could not be left indefinitely until rescued by the fire service or until the fire was extinguished. Few candidates were able to provide details of the features that should be included in the design of a refuge area eg planning to accommodate wheelchairs, planning to enable communication and ensuring access to evacuation routes.

Part b) of the question was often answered well.

Responses to part c), which related to PEEPs, were often poor. PEEPs are bespoke plans for individuals who may not be able to reach an ultimate place of safety unaided or within a satisfactory timescale in an emergency. These plans normally include details of the specific disability, information on the additional measures needed to effect a suitable escape and the additional resources (including people) needed to assist in the escape.

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)*

Examiner Feedback

The concept of an atrium and the associated hazards were widely understood and candidates generally performed well on parts a) and b).

In responding to part c), candidates were required to demonstrate knowledge of smoke management systems. Few candidates attained high marks for this element of the question. The systems that should have been explored in responses were smoke clearance, smoke control, smoke exhaust and air pressure differential.

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)

Examiner Feedback

This question was a popular option for candidates but responses were generally poor and few candidates attained a high mark. Many candidates confused self-closing fire doors with doors that provided final exits and this led them to start from the wrong place in presenting their responses.

In responding to part a), candidates could have written about electromagnetic fire door retainers (hold open devices), acoustic fire door retainers (Dorgard) or free-swing door closers.

Part b) was often poorly answered as candidates generally did not provide examples of the types of conditions that would cause the devices to operate. Candidates should be aware that door releases should be triggered by each or any of the following:

- the detection of smoke by automatic detection
- the actuation of an alarm by a manual fire alarm call point
- failure of the fire warning system
- acoustic signal from smoke alarms
- manual release

Candidates attained few marks for their responses to parts (c) and (d). Candidates needed to consider why premises would fit such devices in the first place in order to draw out the advantages and possible disadvantages. Many candidates focused on how doors might behave in a fire situation. However, advantages of such devices included a broader range of situations and other benefits included reducing damage to doors, preventing doors being wedged open and enabling those with mobility impairments to circulate through building more easily.

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)

Examiner Feedback

Part a) of the question was often answered well.

Part b) was less well answered as few candidates appeared to have the detailed technical understanding required to answer the question.

Few candidates were able to explain the features which enhance the reliability of sprinkler systems. The types of features which could have been described included: all practical steps taken to ensure continuity and reliability of water supplies; stop valves accessible at the floor level of the zone they control; the system should be zoned with each zone being controlled by a separate stop valve and having a maximum of 200 heads; only one zone of a multi-zone installation shut down at any one time; the visual alarm signal remaining active until the installation has been re-set to its normal operational position.