

IFE Level 3 Certificate in Passive Fire Protection

Examiner Report – October 2019

Introduction

59% of the candidates that sat the examination achieved a pass. Some candidates submitted excellent scripts and four candidates scored marks of 90 or above.

Candidates generally performed best on section 1 of the paper. Performance tended to vary in relation to the specialist areas addressed in section 2, perhaps reflecting the specialisms of individuals taking the examination. It was common for individuals to perform well in one of two of the specialist areas but less well in others.

Section 1 - Fire and Fire Protection

This section of the examination tested the content of section 1 of the syllabus ie Fire and Fire Protection. There were 40 marks available. Candidates generally performed well on this part of the paper with the average mark scored being 27 (ie 67.5%). The highest mark scored on this section of the paper was 35.

Question 1

- a) *State the elements of the fire tetrahedron. (4 marks)*
- b) *Explain the term 'exothermic reaction'. (1 mark)*

Examiner Feedback

Part a) was answered well with many candidates scoring full marks. However, in responding to part b), few candidates recognised that exothermic reactions are reactions that release energy into the environment in the form of light or heat.

Question 2

In relation to the process of fire development, explain what is meant by the term 'flashover'. (4 marks)

Examiner Feedback

Whilst most candidates recognised the position of flashover in relation to fire development, few candidates were able to explain the phenomenon in sufficient detail to score full marks. Points could have been covered include:

This almost instantaneous event is characterised by a very rapid rise in temperature and the involvement of all combustible materials in the room. As a fire grows in a compartment, a hot smoke layer at the ceiling of the room grows in depth, effectively trapped by the walls of the compartment. The radiated heat from this layer rapidly heats the surfaces of those

combustible materials directly exposed in the room, causing them to emit flammable gases. When the temperatures of the evolved gases become high enough, these gases will ignite throughout the smoke layer.

Question 3

Describe two ways in which regular fire drills and alarm tests can affect behaviour in a fire. (2 marks)

Examiner Feedback

This question was answered well and most candidates attained full marks.

Question 4

- a) Define the term 'means of escape'. (2 marks)*
- b) Define the term 'travel distance'. (2 marks)*

Examiner Feedback

Few candidates were sufficiently familiar with the terms to provide full definitions. Candidates sometimes provided partial definitions eg omitting to include "without the need for outside assistance" in relation to the definition of means of escape.

Candidates should be aware that:

- A "means of escape" can be defined as the structural means whereby a safe route is provided for people to travel from any location in a building or structure to a place of safety without the need of outside assistance.
- "travel distance" is defined as the actual distance a person needs to travel from any point within a building to the nearest storey exit, having regard to the layout of walls, partitions and fittings

Question 5

State the primary function of passive fire protection. (2 marks)

Examiner Feedback

This question was usually answered well and candidates were able to secure both of the marks available.

Question 6

In relation to fire resistance, explain what is meant by the term 'integrity' and describe the factors that affect integrity. (4 marks)

Examiner Feedback

The term “integrity” was well known and candidate generally provided good responses to this question.

Question 7

Describe the content of a fire test report and explain the possible limitations of such a report. (5 marks)

Examiner Feedback

Some candidates provided only partial responses in that they wrote only about the content of the fire test report or only about the possible limitations. Those candidates who answered the question in full often secured a good proportion of the marks available.

Question 8

Explain why it is important to consider passive fire protection as part of the initial design and brief for a building. (4 marks)

Examiner Feedback

This question was not answered well and several candidates chose to omit it completely. Examples of the points that would have secured marks include:

- to ensure that means of protection/adequate escape time is built in
- to make sure that work is carried out in the correct order so that fire protection is built in at the right time
- to make sure that the correct materials are purchased/used.
- to make sure correct checks are carried out at the right time
- to ensure compliance with regulations

Question 9

Identify and briefly describe three different types of fire suppression equipment available within a building. (6 marks)

Examiner Feedback

Candidates often provided correct examples of equipment such as sprinklers systems, deluge systems, mist systems, gaseous fire suppression systems, hose reels. However, it was common to provide a list of three types of equipment without adding the brief description required; failing to provide the description meant that candidates scored only half of the marks available for the question.

Question 10

Explain what is meant by the term 'responsible person' in the context of fire safety and state three of the activities that a responsible person should carry out. (4 marks)

Examiner Feedback

Most candidates were able to explain the term "responsible person" and secure the mark available for this element of the question. However, many candidates were unable to identify three activities that the person might carry out.

Examples of points that would have scored marks include:

- produce a suitable and sufficient Fire Risk Assessment (FRA)
- ensure the (FRA) is reviewed regularly and amended as necessary
- formally record the (FRA) where the responsible person employs five or more people, the premises are licensed or the Inspector requires it.
- take actions to ensure safety of individuals in the premises
- provide and maintain items such as a clear Means of Escape
- provide signs, notices, emergency lighting, fire detection and alarm systems and extinguishers etc
- conducting fire drills
- ensure maintenance carried out by suitably qualified people

Section 2 - Fire protection to the structural frame and retardant coatings

Questions 11- 15 (inclusive) addressed the element of the syllabus covering fire protection to the structural frame and retardant coatings. There were 24 marks available. The highest mark scored for this section was 21 marks. The average mark scored was 13 (ie 54%).

Question 11

Describe the factors that affect the loadbearing capacity of the following building support systems in fire:

- a) reinforced concrete (3 marks)*
- b) timber (3 marks)*

Examiner Feedback

This question, particularly part b), was usually answered well and many candidates were able to achieve full marks.

Question 12

One of the issues to be taken into account when determining the choice of fire protection system for a particular purpose is the level of fire rating required. Identify four other factors that would be considered. (4 marks)

Examiner Feedback

This question specifically addressed syllabus objective 1.5 within section 2 of the syllabus. Candidates often failed to provide relevant information or sufficient information to score marks for this questions. Examples of the points that could have secured marks include:

- appearance (unless hidden)
- environmental conditions such as humidity and temperature during application, prior to occupation and during use
- lifetime to first major maintenance
- robustness (impact damage)
- consideration of future adaptations, fitting out (partitions), capital and maintenance costs
- whether the fire protection should be undertaken 'off-site' or 'in-situ' on-site

Question 13

- a) *Describe the cementitious-based coating systems that can be applied to structural steel sections. (2 marks)*
- b) *Describe the factors to be taken into account during the application of cementitious-based coatings in order to ensure that the process is effective and the outcome meets the required standards. (4 marks)*

Examiner Feedback

Candidates usually provided relevant descriptions in response to part a).

However, part b) was often answered poorly as candidates were often unable to identify and describe relevant factors. Examples of points that would have secured marks include:

- the manufacturer's recommendations should always be followed
- bagged materials must be kept dry, undercover, stored off the ground and away from wet or damp surfaces or areas of very high humidity.
- the applied material must be protected from extremes of weather (freezing or warm drying winds, radiant heat or running water) during application and initial curing.
- the sprayed coating should not be applied unless the substrate and air temperatures are appropriate
- provision should be made for adequate ventilation during and after application until the non-reactive coatings are dry.
- coating thicknesses should be continuously checked to ensure that the correct thickness is applied

Question 14

Explain how intumescent coatings work and how their activation can contribute to the load bearing capacity of steel frames. (4 marks)

Examiner Feedback

This aspect of the syllabus appeared to be well understood with most candidates securing at least half of the marks available for this question.

Question 15

Describe the limitations associated with the impregnation treatments used for timber and wood-derived buildings materials. (4 marks)

Examiner Feedback

Again, this topic was well understood and most candidates secured at least half of the marks available.

Section 2 – Fire-resisting walls, floors and ceilings and fire resistant glazing

Questions 16 - 20 (inclusive) addressed the element of the syllabus covering fire-resisting walls, floors and ceilings and fire resistant glazing. There were 20 marks available. The highest mark scored for this section was 14 marks. The average mark scored was 8 (40%).

Question 16

Define fire-resisting suspended ceilings and describe the materials from which they are generally constructed. (5 marks)

Examiner Feedback

Most candidates were able to define fire-resisting suspended ceilings. However, candidates sometimes failed to provide sufficient information on the construction materials to secure marks. Candidate should be aware that this type of ceiling is usually constructed from gypsum, stone wool or calcium silicate based products supported on a lightweight steel framework.

Question 17

Describe the factors affecting the degree of fire resistance required of compartment walls. (4 marks)

Examiner Feedback

Few candidates were able to describe factors affecting the degree of fire resistance required of compartment walls and failed to identify factors such as the specified fire resistance period, the height of the top floor above ground and the intended use known as the purpose group of the building, whether fire resistance is expected from one side or both sides of the barrier, the type of fire performance required i.e. stability, integrity and insulation.

Question 18

Describe how non-fire rated glass behaves in fire. (4 marks)

Examiner Feedback

This question was usually answered well with most candidates securing at least some of the marks available. Candidates usually identified that non-fire-rated glass will soon crack and fall from its frame when involved in fire. Further marks were achieved by candidates who went on to explain how firefighting water causes thermal shock that can result in glass shattering violently.

Question 19

Describe the performance considerations when using metal frames to support fire resistant glazing. (4 marks)

Examiner Feedback

Few candidates focussed on performance considerations. Points that could have been covered in responses included:

- metal frames should not be used either for fire screens or fire doors without first checking that there is appropriate fire test evidence
- metal frames expand when heated which can lead to flexing and twisting of the frame
- this means that provision for thermal expansion is particularly important.
- the fixings of the framed assembly to the supporting structure should also allow for expansion.
- other factors that influence performance are thermal conductivity, oxidation, loss of strength and melting.
- different framing constructions are used for aluminium and steel in view of their different thermal properties

Question 20

Active fire curtain barriers are normally used to provide compartmentation and to protect means of escape. Identify three locations where active fire curtain barriers may be installed. (3 marks)

Examiner Feedback

This question was usually answered well with most candidates familiar with the use and location of active fire curtain barriers.

Section 2 - Fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope

Questions 21 - 25 (inclusive) addressed the element of the syllabus covering fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope. There were 24 marks available. The highest mark scored for this section was 23 marks. The average mark scored was 13 (ie 56%).

Question 21

- a) *Explain the purpose of fire stopping. (2 marks)*
- b) *State four factors to be considered when selecting and installing fire stopping in a building. (4 marks)*

Examiner Feedback

Some candidate provided vague responses to part a) and appeared to confuse fire-stopping with fire safety in general. Good responses covered some or all of the following points: fire-stopping is used for sealing apertures and imperfections of fit, or design tolerance between fire resisting walls, floors and ceilings to restrict the passage of fire and smoke; fire-stopping products should have at least the same fire resistance as the separating elements into which they are installed.

Part b) was generally answered well with candidates securing full marks for this part of the question.

Question 22

State three methods to fire-stop and seal horizontal pipe penetration through a fire resisting wall or floor. (3 marks)

Examiner Feedback

This question was usually answered well with many candidates securing full marks.

Question 23

In relation to fire stopping and sealing systems, explain where and how plugs/blocks would be used. (5 marks)

Examiner Feedback

This question was not answered well and few candidates secured many (if any) marks for their response. Examples of the types of points that could have been covered in responses include:

- plugs/blocks are useful where services require occasional re-routing
- the various types can be loose laid, compression/friction fitted, or bonded together
- some types will require a fire resistant sealant to be applied along joints and interfaces
- some plugs/blocks, such as those based on calcium, potassium or sodium silicate, (e.g. bonded vermiculite plugs/blocks) may require additional protection in high humidity environments.
- pre-formed trapezoidal plugs/blocks are available for sealing openings below profiled metal decking.
- plugs/blocks to fit around cables and pipes are formed from materials such as bonded vermiculite, stone wool, gypsum or cementitious materials, polyurethane, modified rubber, etc; they can be rigid or flexible.

Question 24

In relation to the methods used to maintain the fire resistance of walls and floors penetrated by ventilation ducts, explain the features and limitations of protection using fire resisting ductwork. (4 marks)

Examiner Feedback

Few candidates demonstrated understand of the features and limitations of protection using fire-resisting ductwork.

Question 25

Identify and describe three different types of damper. (6 marks)

Examiner Feedback

This question was usually answered well with many candidates able to secure three marks by identifying three types of damper and with others securing the additional three marks for the required description.

Section 2 - Fire-resisting doors, industrial shutters and associated hardware

Questions 26 - 27 (inclusive) addressed the element of the syllabus covering fire-resisting doors, industrial shutters and associated hardware. There were 12 marks available. The highest mark scored for this section was 11 marks. The average mark scored was 6 (50%).

Question 26

Explain the purpose and operation of air transfer grills in fire doors. (4 marks)

Examiner Feedback

This question was generally answered well. However, few candidates recognised that such systems will not prevent the passage of cold smoke.

Question 27

- a) Describe four checks that would be carried out prior to installing the door frame for a fire door. (4 marks)*
- b) Describe four checks that should be carried out in relation to the intumescent fire and smoke seals used on a fire door. (4 marks)*

Examiner Feedback

This question was usually answered well with most candidates demonstrating enough understanding of installation and checking issues to secure at least half of the marks available.

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