



**THE INSTITUTION OF FIRE ENGINEERS**  
Founded 1918 • Incorporated 1924

# **IFE Level 2 Certificate in Passive Fire Protection (603/3640/7)**

**Friday 15 March 2019**

**14.30 – 16.00**

## **Instructions to Candidates**

1. You **must** record all of your answers in the answer book provided.
2. This examination paper contains two sections. You must answer:
  - **ALL** of the questions in section one
  - Select **TWO** of the specialist options in section 2 and answer all of the questions within each of the specialist options chosen.
3. At the end of the examination, the answer book and this question paper will be collected by the invigilators. You will not be allowed to keep any examination stationery.
4. The time allowed for this examination is **One hour and 30 Minutes.**

## Section 1

***There are 20 marks available for this section of the examination. You should answer all questions.***

1. Describe from a scientific perspective, the following two stages of fire development:

a) Ignition

(2 marks)

b) Decay

(3 marks)

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2. State four factors that affect the length of time it takes a person to react to a fire alarm.

(4 marks)

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3. Explain what is meant by passive fire protection and give two examples of different passive fire protection systems that can be found in buildings.

(3 marks)

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4. One of the factors that affects the fire resistance of a building is integrity. Identify and describe two other factors.

(4 marks)

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5. Identify two different passive fire protection measures that may rely on smoke detection or fire alarm systems and describe the basic principle of operation of each.

(4 marks)

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<b>Section Two</b>
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**This section of the paper is divided into four options. There are 30 marks available for each option.**

**Candidates should select TWO options from the following:**

Option 1 - Fire Protection to the Structural Frame of the Building

Option 2 - Fire Resisting Walls, Floors and Ceilings

Option 3 - Fire Stopping and Penetration Seals, Cavity Barriers, Ductwork and Dampers and the Building Envelope

Option 4 - Fire Resisting Doors, Industrial Shutters and associated Hardware

***Note: no additional marks will be awarded where candidates respond to questions from more than two options.***

**Please Turn Over**

## Option 1 - Fire Protection to the Structural Frame of the Building

1.1 Concrete framed buildings are usually designed in a way that does not require the addition of passive fire protection systems.

a) Explain when additional fire protection may need to be applied. (2 marks)

b) Describe two methods by which this may be achieved. (2 marks)

c) Explain two factors that govern the performance of structural concrete in buildings. (2 marks)

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1.2 Describe two options available to ensure the fire resistance of timber. (4 marks)

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1.3 Describe how steel is affected by heat in a building fire and state the factors that affect the fire resistance of a steel frame. (5 marks)

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1.4

a) With respect to structural steel protection, state the purpose of cladding systems made from fire-resisting boards or stone wool products and state where they may be used. (3 marks)

b) State three different types of materials that are used in the manufacture of these boards. (3 marks)

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1.5 In relation to materials used to enhance the structural resistance of steel, describe each of the following methods of application:

a) profile (2 marks)

b) solid (2 marks)

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1.6

a) Explain why minor damage to intumescent coating systems should be repaired at the earliest opportunity. (2 marks)

b) State the process to follow when repairing damage to intumescent coating systems. (3 marks)

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## Option 2: Fire Resisting Walls, Floors and Ceilings

2.1 Two different types of fire resistant floors are timber joist floors and concrete floors. For each of these two types of floors explain how they may be affected by fire and describe the fire protection methods that can be applied to enhance fire resistance.

(8 marks)

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2.2 State four different types of boards that may be used in partitioning systems designed to enhance the fire resistance of compartment walls.

(4 marks)

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2.3

a) Describe the way that active fire curtain barriers operate.

(3 marks)

b) State three different types of active fire curtain barriers.

(3 marks)

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2.4 Explain the purpose of fire resisting ceilings.

(2 marks)

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2.5 Describe each of the following types of glazing and state how each behaves in fire:

a) wired glass

(3 marks)

b) laminated composites

(3 marks)

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2.6 Identify four factors to be considered when glass is supported by a timber framing.

(4 marks)

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**Please Turn Over**

### Option 3: Fire Stopping and Penetration Seals, Cavity Barriers, Ductwork and Dampers and The Building Envelope

3.1 Describe, with the use of an example, the situations where the following fire-stopping products and services would be used:

- a) penetration seals (2 marks)
- b) small cavity barriers (2 marks)
- c) open state cavity barriers (2 marks)

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3.2 Describe two fire stopping/sealing systems that could be used in relation to cable penetration.

(2 marks)

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3.3

- a) Explain the purpose of pipe closures. (3 marks)
- b) State two different methods of pipe closures. (2 marks)
- c) Describe how pipe closure systems work. (3 marks)

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3.4 Describe the use of ductwork.

(2 marks)

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3.5

- a) Describe the operation of a curtain fire damper. (4 marks)
- b) State two other types of dampers. (2 marks)

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3.6

- a) State three purposes of cladding. (3 marks)
- b) Explain how cladding can affect external fire spread. (3 marks)

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## Option 4: Fire Resisting Doors, Industrial Shutters and associated Hardware

4.1 Describe the purpose of fire doors.

(4 marks)

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4.2 State three locations in a public building where fire doors should be fitted.

(3 marks)

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4.3 Describe each of the following:

a) fire doorset

(4 marks)

b) fire door assembly

(4 marks)

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4.4

a) Describe the purpose of intumescent seals.

(1 mark)

b) Describe the factors to be considered when fitting intumescent seals and describe how they operate in case of fire.

(5 marks)

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4.5 Explain the factors to be taken into account when fitting hinges to a fire door.

(3 marks)

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4.6 State the checks that would be completed when carrying out a maintenance inspection in relation to:

a) door leaf and frame of a fire door

(3 marks)

b) locks and lever handles

(3 marks)

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