



THE INSTITUTION OF FIRE ENGINEERS  
Founded 1918 • Incorporated 1924

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

Monday 7 October 2019

10.30 – 12.00

### 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. State the five stages of fire development.

(5 marks)

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2. State four factors that affect how quickly people move when they hear a fire alarm.

(4 marks)

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3. Describe the purpose of passive fire protection.

(3 marks)

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4. In relation to the principles of means of escape in case of fire, explain what is meant by:

a) place of reasonable safety.

(2 marks)

b) place of total safety.

(2 marks)

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5. Give one example of a smoke detection system and one example of a heat detection system.

(2 marks)

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6. State two types of sprinkler systems that may be available within a building.

(2 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, Ceilings and Fire-Resistant Glazing

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 Identify three factors that affect the fire resistance of concrete frames. (3 marks)

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1.2 Describe what is meant by 'sacrificial timber' and explain how this improves the stability of timber in fire. (4 marks)

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1.3 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) Box (2 marks)

c) Solid (2 marks)

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1.4 Describe three different types of fire protection boards. (6 marks)

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1.5 Explain how steel behaves in fire and the way that this affects the fire protection required. (4 marks)

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1.6 a) Describe how thick reactive (intumescent) paint coatings on steel sections perform in fire conditions. (3 marks)

b) Describe four checks that would be carried out when applying intumescent paint on a steel section. (4 marks)

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## Option 2: Fire Resisting Walls, Floors and Ceilings and Fire-Resistant Glazing

2.1 Explain the purpose of a compartment wall. (3 marks)

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2.2 Explain how timber joist floors may be affected by fire and describe the fire protection methods that can be applied to enhance fire resistance. (4 marks)

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2.3 Describe how concrete floors perform in a fire. (4 marks)

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2.4 a) Describe the purpose and operation of active fire curtain barriers (3 marks)

b) Identify three types of fire curtain barriers. (3 marks)

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2.5 Describe three factors affecting the degree of fire resistance required. (3 marks)

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2.6 Identify and describe three different types of 'integrity rated glazing'. (6 marks)

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2.7 The way that a glazing system is supported is critical to its performance in fire. a) Describe the purpose and use of glazing seals. (2 marks)

b) Describe the purpose and use of glazing beads. (2 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 Explain the purpose of fire stopping.

(2 marks)

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

a) linear joint seals

(2 marks)

b) small cavity barriers

(2 marks)

c) open state cavity barriers

(2 marks)

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3.3 One method of fire stopping is bags/pillows. Describe the circumstances when this would be an appropriate option and state why this is the case.

(4 marks)

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3.4 Describe fire barriers and state where they are used.

(4 marks)

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3.5 Describe three methods of maintaining the fire resistance of walls and floors penetrated by ventilation ducts.

(6 marks)

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3.6

a) Describe the operation of an intumescent fire damper.

(3 marks)

b) Name two other types of dampers.

(2 marks)

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3.7 In relation to the construction and design of the building envelope, describe how cladding can affect the fire resistance of a building.

(3 marks)

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

4.1 State four locations in a building where fire doors should be fitted. (4 marks)

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4.2 In relation to the materials used in the construction of fire resisting door leaves, identify two different types of door leaf construction and describe the features of each type. (6 marks)

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4.3 Describe the purpose and construction of fire resisting roller shutters. (4 marks)

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4.4 Identify three ironmongery items found on a typical fire-resistant door and for each item state one consideration in relation to maintaining fire resistance. (6 marks)

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4.5 Identify and explain the purpose of two pieces of information (signage) that should be displayed on fire doors. (4 marks)

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4.6 State three checks that would be completed when carrying out a fire resisting door maintenance inspection in relation to each of the following:

a) intumescent fire or smoke seals. (3 marks)

b) closing and opening devices. (3 marks)

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