L2CP

THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

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

Monday 12 October 2020

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.

a) One of the methods used to extinguish fire is smothering. Explain why this method is used.

(2 marks)

b) Describe two other methods used to extinguish fire.

(2 marks)

2.

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

(4 marks)

3.

Describe the primary purpose of passive fire protection and, using examples, explain how passive fire protection measures contribute to preventing and containing fire.

(4 marks)

4.

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

(4 marks)

5.

Describe the purpose and use of rising mains and explain how they contribute to tackling fires.

(4 marks)

Section Two

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 and flame retardant coatings

Option 2 - Fire resisting walls, floors and 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 and flame retardant coatings

1.1

a) Describe how structural concrete behaves in fire.

(2 marks)

b) Describe two methods by which additional fire protection may be applied to concrete.

(2 marks)

1.2

In relation to measures to enhance the fire-resistance of timber structures:

a) explain what is meant by “sacrificial timber” and explain how this improves the stability of timber in fire.

(4 marks)

b) describe the process of impregnation treatments and state the limitations with this type of treatment.

(4 marks)

1.3

Explain how steel behaves in fire and the way that this determines the fire protection required.

(4 marks)

1.4

Describe how reactive (intumescent) paint coatings on steel sections perform in fire conditions.

(4 marks)

1.5

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

a) Box

(2 marks)

b) Solid

(2 marks)

1.6
State six checks that would be carried out at a site inspection in relation to the use of board systems for the fire protection of structural steel.

(6 marks)

[Please Turn Over]

Option 2: Fire resisting walls, floors and ceilings and fire resistant glazing

2.1
Two different types of fire resisting 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)

2.2
Describe four functions of fire resisting partitions.

(4 marks)

2.3
a) Explain the purpose of fire resisting suspended ceilings and state the factors to be considered in maintaining the integrity of the ceiling.

(4 marks)

b) Describe two materials used in the construction of ceilings to provide fire resistance.

(2 marks)

2.4
In relation to compartmentation fire performance, state three factors affecting the degree of fire resistance required.

(3 marks)

2.5
a) Explain what is meant by “integrity rated glazing”.

(3 marks)

b) Identify and describe two different types of “integrity rated glazing”.

(4 marks)

2.6
The way that a glazing system is supported is critical to its performance in fire. Explain the purpose and use of glazing seals.

(2 marks)

Option 3: Fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope

3.1

a) Explain the purpose of fire stopping.

(2 marks)

b) Explain, with an example of use, the difference between linear seals and penetration seals.

(4 marks)

3.2

a) Explain the purpose of pipe closures.

(2 marks)

b) Identify and describe two different methods of pipe closures.

(6 marks)

3.3

Describe fire barriers and describe where they are used.

(4 marks)

3.4

Describe the two methods of maintaining the fire resistance of walls and floors penetrated by ventilation ducts:

a) protection using fire resisting enclosures

(2 marks)

b) protection using fire resisting ductwork

(2 marks)

3.5

Describe the operation of a Curtain Fire Damper.

(4 marks)

3.6

State four reasons for the use of external cladding.

(4 marks)

[Please Turn Over]

Option 4: Fire resisting doors, industrial shutters and associated hardware

4.1
Describe each of the following:

a) fire doorset

(4 marks)

b) fire door assembly

(4 marks)

4.2
A door leaf may be formed of timber or steel.

a) Describe the typical design of a timber door leaf, state the fire resistance periods possible and give an example of where a door of this type would be used.

(3 marks)

b) Describe the typical design of a steel door leaf, state the fire resistance periods possible and give an example of where a door of this type would be used.

(3 marks)

4.3
State three types of apertures that may be cut into door leaves and explain the considerations relevant to the cutting of apertures.

(6 marks)

4.4
State three checks that would be carried out prior to the installation of a fire door in relation to each of the following:

a) the door frame

(3 marks)

b) the ironmongery

(3 marks)

4.5
State four checks that would be completed when carrying out a fire resisting door maintenance inspection in relation to closing and opening devices.

(4 marks)