L3D2

THE INSTITUTION OF FIRE ENGINEERS
Founded 1918 • Incorporated 1924

IFE Level 3 Diploma in Fire Science and Fire Safety

Unit 2: Fire Safety (F/505/6006)

Thursday 12 March 2020

10.30 – 13.30

Instructions to Candidates

1. The time allowed for this examination is **THREE** hours.

2. Candidates must answer **SIX** questions from the total of **EIGHT** questions set for this examination.

3. All questions carry equal marks and may be answered in any order. Candidates should follow the instructions provided in the question when composing their answers.

4. Candidates should record all of their answers in the answer book provided.

5. The question paper must be handed in with the answer book.

Question 1

a) Describe the physical effects on a simple beam when a load is applied to it and explain what is meant by the term “neutral axis” or “neutral plane”.

(4 marks)

b)

i) Explain what is meant by the term “bending moment of a beam”.

(1 mark)

ii) Describe the physical effect of the bending moment and state the practical application of this bending moment.

(4 marks)

c)

i) Explain why a concrete beam should be reinforced.

(2 marks)

ii) Explain why steel is used as the reinforcing material.

(8 marks)

iii) Explain how the thickness of the concrete affects the reinforcing steel.

(1 marks)

Question 2

a) State the locations where you would expect to find fire-resistant constructed walls and/or floors incorporated into the construction of a building.

(5 marks)

b) Explain the purpose of fire stopping and state three situations where fire stopping would be required.

(5 marks)

c) Describe the purpose and operation of open cavity barriers and state two situations where they would be used.

(5 marks)

d) Describe the purpose and operation of smoke control systems and state two situations where smoke control systems should be provided.

(5 marks)

Question 3

You have been asked to advise a large organisation on the development of a fire safety training programme for use across the whole organisation. Describe the issues that should be included in the programme.

(20 marks)

Question 4

a) In the context of fire alarm signals, what is an “unwanted fire signal”?
(3 marks)

b) What does the term “soak period” refer to in respect of fire alarm systems?
(3 marks)

c)
i) What is a staged fire alarm?
(2 marks)

ii) Describe four situations where a staged fire alarm would be appropriate.
(12 marks)

Question 5

You have been asked to provide fire safety advice at a large-scale construction site.

a) Outline the issues that should be covered in the fire safety plan for the site.
(10 marks)

b) State the responsibilities of the site Fire Safety Co-ordinator.
(10 marks)

Question 6

a) Outline the two main hazards normally associated with “dead ends”.
(2 marks)

b) Describe the measures that can be taken to reduce hazards and risks in “dead end” conditions.
(15 marks)

c) Explain what is meant by the term “the 45-degree rule” in respect of means of escape from a room or storey exit.
(3 marks)

[Please turn over]

Question 7

a) Outline the fire safety systems that should be incorporated in a compartment that utilises a CO_2 total flooding system to protect the equipment provided in that compartment.

(10 marks)

b) Particular factors give rise to certain types of fire detectors being suitable or not suitable for installation in buildings. State one positive and one negative factor relevant to the use of each of the following types of detectors and systems:

i) optical detectors

(2 marks)

ii) beam detectors

(2 marks)

iii) ultra violet detectors

(2 marks)

c) Explain why aspirating smoke detectors are useful in offering a suitable alternative to conventional fire detectors and provide an example of where the detector should be used.

(4 marks)

Question 8

a) In terms of fire testing, define:

i) stability

(1 mark)

ii) integrity

(1 mark)

iii) insulation

(2 marks)

b) State the main functions of a fire door.

(4 marks)

c) State six features of a fire door.

(6 marks)

d) Describe the testing process for determining the fire resistance of a timber fire door.

(6 marks)
