Chapter 5

Building Systems and Utilities

Section A: True/False

Directions: Write True or False on the blanks provided; if False, write the correct statement on the lines provided.

1. _____ In order for a building system to influence fire development, it generally must have some type of system defect. (141)

2. _____ The building owner and/or management is responsible to ensure that the necessary building systems initially provide the intended level of fire and life safety. (141)

3. _____ A building system that is improperly connected, designed, modified, or installed may contribute to the ignition and/or spread of the fire. (141)

4. _____ Fire investigators should consider whether stairs, their enclosures, or any associated systems, contributed to fire spread. (143)

5. _____ Pressurized stairwells maximize the use of space while still protecting stairways from the products of combustion. (143)

6. _____ Shafts for ductwork, piping, and wiring are included as part of the transportation and conveyance systems category. (144)

7. _____ Energy-production systems can provide either the heat energy or fuel necessary for a fire, especially when equipment is not properly operated or maintained. (152)

8. _____ The energy feed from photovoltaic cells can be isolated or shut off. (154)

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9. _____ FACP records are typically very helpful in determining any problems with the system prior to the fire. (157)

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10. _____ An investigator should seek to determine whether the water-based suppression system was compliant with the manufacturer's instructions and all applicable codes as part of an investigation. (159)

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Section B: Fill in the Blank

Directions: Write the correct answer on the blanks provided.

1. Generally speaking, building systems fail or are defeated through _____, _____, and _____. (142)
2. Codes may require buildings with four or more stories in height to have a _____, identified by _____, that extends to the roof for access to mechanical equipment. (143)
3. A _____ is a type of smoke control for stairways that is separated from a building corridor by a vestibule that is open to the atmosphere. (143)
4. The use of _____ on both sides of a horizontal opening is a method of protection for horizontal penetrations of building compartmentation or penetrations of floors with no shafts. (145)
5. Failures within the piping in fuel-gas systems typically occur at _____ or _____. (146)
6. _____ systems should be handled with the same care as any other electrical system: all wiring and conduits must be assumed to be live. (154)
7. An investigator should request installation, maintenance, and inspection records for active fire protection components to show whether they were _____ at the time the fire occurred. (155)
8. Investigators should remember that any sprinkler-system component may be evidence and therefore subject to _____ and _____ just like any other piece of evidence. (159)

9. Energy-production systems can provide either the heat energy or fuel necessary for a fire, especially when good _____ practices are not followed near the devices. (152)

Section C: Matching

Directions: Write the correct answers on the blanks provided.

Part I: Environmental Systems

Match the type of environmental system with the description on how they affect fire conditions.

Choices:

A. Air handling system

B. Smoke control system

C. Smoke and heat vents

Descriptions:

_____ 1. A simple and rapid means of ejecting products of combustion from inside the building that enables firefighters to make a faster and safer interior attack and dissipate some of the thermal energy of a fire. (151)

_____ 2. Uses dampers that restrict air supply to the fire floor. (151)

_____ 3. Uses equipment that may be fueled with natural gas or oil. These fuels may be stored within the structure. (149)

Section D: Multiple Choice

Directions: Write the correct answers on the blanks provided.

_____ 1. What should an investigator address when examining piping in a building? (142)

A. Piping schedule
B. The diameter and length of the piping
C. Whether the piping is made of copper or aluminum
D. Whether the piping had penetrations that would allow for fire extension or smoke travel

_____ 2. Stairwells may be designed to pressurize when: (143)

A. a earthquake occurs.
B. the fire alarm system activates.
C. a putrid smell is detected inside the building.
D. the ambient temperature is above 95 degrees Fahrenheit.

_____ 3. What is a common fire-related problem with wiring and piping systems? (145)

A. Penetrations in walls and floors can allow fire spread around them if the openings are not properly fire-stopped or otherwise protected.
B. Penetrations in walls and floors can allow fire spread around them even if the openings are properly fire-stopped or otherwise protected.

C. Heat can be transferred by radiation and cause the ignition of adjacent combustible materials some distance from the initial heat source.

D. The increased use of metal in pipes and wire insulation increases the potential that the fire can consume the wiring or piping, and pass through a barrier.

_____ 4. Telecommunications cables are often installed: (145)

A. protected, tied together, or listed for use in concealed spaces.

B. unprotected, tied together, or listed for use in concealed spaces.

C. protected, tied together, or not listed for use in concealed spaces.

D. unprotected, tied together, or not listed for use in concealed spaces.

_____ 5. In order to prevent smoke or fire from traveling through a building via the ductwork, building and fire codes may require the installation of: (147)

A. smoke extraction fans.

B. sprinklers inside ducts.

C. smoke detector cameras inside ducts.

D. smoke and/or fire dampers within the ducts.

_____ 6. Which NFPA standard regulates the design and installation of electrical systems? (152)

A. NFPA 54

B. NFPA 58

C. NFPA 70

D. NFPA 1001

_____ 7. Fire detection and alarm system activations, times, or sequences may provide useful information for determining: (158)

A. area of origin.

B. the heat release rate of the fire.

C. who initiated the fire.

D. how the fire was extinguished.

_____ 8. A fire that exceeds the operational capacity of the sprinkler system may: (159)

A. extinguish quickly.

B. be contained to the room of origin.

C. continue to burn even though the system activated.

D. continue to burn and the system will not be activated.

_____ 9. Sprinklers can minimize damage in the area of origin while spreading the fire to unprotected areas, which may make the area of origin: (159)

A. larger.

B. smaller.

C. easier to identify.

D. more difficult to identify.

_____ 10. What should an investigator carefully examine when a standpipe and hose system fail to function properly? (159)

A. Who used the system
B. Quality of water that was used
C. Evidence of wear and tampering
D. How long the system and components were used during the fire

Section E: Short Answer

Directions: Write the correct answers on the lines provided.

1. What are three ways that building systems fail or are defeated? (142)

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2. What should the investigator evaluate when fire protection systems are present? (155)

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3. What information from the FACP may an investigator be able to use to assist in determining the origin of the fire and its spread? (157)

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4. What should an investigator do if the building owner or restoration company arrives at the scene and removes/replaces the affected sprinkler activation devices prior to the arrival of the fire investigator? (159)

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5. When a fire occurs in a commercial kitchen and a wet chemical suppression system is involved, what information does the investigator need to obtain? (160)

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6. What can investigators analyze to determine whether there was unlawful entry into a structure? (161)

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7. How can the sequence of alarm activation help an investigator? (161)

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8. What kind of valuable information could an investigator get from a specialized-access entry system? (163)

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Section F: Scenario

Directions: Answer the following questions based on the scenario below.

Scenario 1 (149)

Upon arriving at the emergency scene, the IC informs you that the air handling system was activated throughout the fire. The smoke control system automatically activated all dampers located on the fire floor.

1. How could this have significantly impacted the fire?

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