

BUSI 401 – Answer Guide 7

CHAPTER 10: Multi-Family Properties CHAPTER 11: Office Properties

1. Answer: 3

Option (3) is the most popular option because it is economical; flexible in design and fire resistant. Option (1); steel is less economical since it requires additional fire proofing. Option (2); masonry and timber is less common due to more stringent fire laws. Option (4); the market preference for concrete and limitations on building height have restricted the use of wood frame for mid – to high-rise projects.

2. Answer: 3

Statements B, C, and D are false. Seismic upgrades are necessary in the “re-use” of these buildings. Local governments sometimes encourage their revitalization by relaxing the seismic requirements. Marketability is the test of functional utility; an appraiser would analyse standard market expectations and not the latest trends. Statement A is true. Proper suite mix should meet market demands.

3. Answer: 3

Option (3) is false. Structural bay spacing in older buildings was usually between 12 feet and 16 feet. Now the recommended spacing is 30 feet. Option (1) is true since wood frame has a greater fire risk than concrete. The increased risk might require a higher insurance premium. Option (2) is true since the office park is usually located outside of the city core and often close to an airport and attractive to those tenants who are required to travel frequently. Option (4) is true since this forms part of the emergency plan of the building.

4. Answer: 2

Statements A, C, and D are correct. The core area of the office contains the following: the elevator system, the primary staircases, washroom facilities, electrical room, fan room, duct space and the elevator lobby with fire hose cabinet. Statement B is incorrect; a curtain wall is part of the building envelope, not the core of the building.

5. Answer: 4

Fire doors are required for electrical switch rooms, entrances to fire escape staircases, and boiler rooms, but are not required for entrances to tenant suites. Thus, option (4) is correct.

6. Answer: 1

Option (1) is correct; the Insurance Bureau of Canada classifies Class 1 buildings as having the most fire resistance materials in walls, floors, and roof systems. Class 2 use similar materials as those used in Class 1 buildings, but with a lower fire-resistance rating [Option (2)]. Options (3) and (4) are not a part of the IBC building class rating system.

7. Answer: 3

Statements A, B, and D are correct. The appraisal report should cover the neighbourhood and its amenities, any deferred maintenance and the condition of the suites. Statement C is not correct; the appraisal report will typically have a disclaimer regarding a property’s environmental condition. Rather, an environmental assessment is typically done by a qualified environmental consultant.

8. Answer: 4

All the options are correct. Separate building codes exist to address energy efficiency, accessibility, public health, and fire safety

9. Answer: 4

Prior to the 1900s, commercial buildings were generally restricted to six floors because of the issues presented with climbing stairs and moving furniture. The widespread use of electric gearless traction elevators in the early 1900s significantly increased the height of construction for commercial buildings [option (4)]. Options (1) and (2) are incorrect; thicker masonry walls and high pressure water utility systems were required for tall buildings, but it was not the invention or improvement of these components which led to an increase in building height. Option (3) is incorrect; improvements in concrete technology happened later, and were responsible for the evolution of buildings in the 1960s.

10. Answer: 3

Option (3) is correct; one of the main disadvantages of steel is its loss in strength and rigidity in the heat of a fire requiring a fireproof coating and, additional expense. Option (1) is incorrect because steel construction is quicker than concrete construction. Option (2) is incorrect because modern steel innovations have allowed steel to resist high levels of lateral forces. Option (4) is incorrect because the faster building time of steel results in making it more cost effective than concrete construction when constructing buildings over 30 storeys high.

11. Answer: 4

All of the options are correct. Wood has a lower environmental impact compared to other construction materials. Wood is the most cost effective option for small, one-storey, mixed use office buildings built with a concrete parking garage or reinforced concrete commercial floor units at street level. Wood is often used in the construction of institutional buildings attempting to attain a LEED certification.

12. Answer: 1

Ceiling finishes will depend upon use, occupancy, and degree of fire protection and economy desired.

13. Answer: 2

Option (2) is correct. The primary constraint for the maximum height of a modern high-rise building is not the strength of building materials, but rather the loss in floor-space efficiency. As a building's height increases, more space is required for mechanical systems, elevators, and service rooms.

14. Answer: 2

Statements A, B, and C are correct. The building core is positioned to avoid long corridors between office space and the elevator bank (Statement A). Otherwise, a second core may be required. Another consideration that may determine layout is fire evacuation planning and the requirement for stairs to provide an optional fire escape (Statement B). A third consideration is seismic design in high earthquake risk zones, such as the west coast of North America and much of Mexico (Statement C). In these areas, lateral stiffness must be provided to the building and the second staircase often performs this function. Statement D is incorrect because soil properties would be considered when designing the substructure, and occurs prior to designing the building core (superstructure).

15. Answer: 3

Option (3) is correct. Cable elevators are usually seen in high-rise buildings, not in smaller, masonry constructions. All the other options are typical of masonry construction. Wood stud shear walls with plywood sheathing provide resistance against lateral loading [option (2)]. Masonry bearing walls are usually reinforced by steel rods inserted in the cavities that are then filled with grout, perlite, or vermiculite insulation [option (1)]. The non-load-bearing partitions are usually wood frame with gypsum wallboard [option (4)].

16. Answer: 2

Option (2) is correct; infill is best described as the material that fills the spaces between the structural materials in order to achieve a complete building envelope. Examples of infill materials are curtain walls and window walls. Option (1) is incorrect; spalling refers to the peeling of surface layers of concrete. Option (3) is incorrect; masonry is a type of construction where unit masonry is a structural material in and of itself. Option (4) is incorrect; building caissons are a type of building substructure.

17. Answer: 4

Option (4) is correct; a tubular steel frame design has the key advantage of having a high resistance to lateral forces. Tall buildings which experience strong winds need to be resistant to lateral forces. Option (2) is incorrect; other designs could be used to construct a small office building at a more economical price. Option (3) is incorrect; steel plates and anchors are used to adapt heritage buildings, along with long steel pins connecting exterior walls to improve lateral resistance to movement. Option (1) is incorrect; structural steel must be pre-ordered and design changes cause significant construction delays.

18. Answer: 2

Option (2) is false because more space is required – before the proportion of service area was about 15% of gross floor area, while today the service area in well-planned buildings is typically 20% or more. All the other options are true.

19. Answer: 3

Statement D is false. In general high-rise construction is more expensive given reinforced concrete construction, high speed elevators and HVAC requirements. Statements A, B, and C are all true.

20. Answer: 3

Statements B, C, and D are correct; the reduction in the ceiling/floor thickness can be accomplished either by a thinner beam and slab system or by reducing the depth of the ceiling suspension system. Statement B is true. Statement C is true and may be reflected by lower rents and higher vacancy. Statement A is incorrect; the use of drywall and metal studs is a better option when noise transmission is an issue.