BUSI 400 – Answer Guide 1

CHAPTER 1: Drawings and Design
CHAPTER 2: Neighbourhood Analysis

This Assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 3

   An architectural scale of 10" = 1'0" means a measurement of 10 inches equals 1 foot. A measurement of 2½ on the same scale would therefore represent a length of 0.25 feet (2.5 inches x 1/10 ft/in.).

2. Answer: 2

   Design drawings show the concept, general appearance, and function of a building. These generally consist of floor plans and front elevation or perspective drawing. Design drawings are often used as advertising tools in magazines or developers' brochures. As well, they are used by designers to convey the intent of a house design to the owner prior to starting final working drawings.

3. Answer: 4

   Working drawings show details and dimensions for the entire project. These drawings are used for the construction of the project (hence also called construction drawings) and include a detailed site plan, detailed floor and basement plans, four exterior elevations showing finish materials, and technical specifications. For simpler houses, the architectural, structural, mechanical, and electrical components can be shown on one architectural drawing; larger and more complex houses may require a separate drawing for each of these.

4. Answer: 4

   All options are possible outcomes of having spot commercial uses in a single-family residential neighbourhood.

5. Answer: 3

   Internal variables of a district or neighbourhood include zoning and existing land use, option (C); character and appearance, option (D), as well as amenities. Connective and static elements are both types of external variables, options (A) and (B).

6. Answer: 2

   The engineering scale is typically used for site (or plot) plans and by a city to show the location of services, such as sewers. The scale is based on the division of 1 inch by multiples of ten.

7. Answer: 4

   Site plans show the location and size of water, storm sewer, and gas mains; and transformers and electrical services – all of which are underground connections to street services. Site plans also show the site size and corner angles; abutting streets or lanes; location and dimensions of driveways, units and outbuildings; elevation of the finished main floor and ground level; and landscape plans.

8. Answer: 4

Statements A and C are false. Construction practices have not been substantially altered by the metric scale since the building industry in North America has been slow in its full acceptance, whereas metric scale is evident in government bylaws and zoning regulations and used when uploading data into the municipal and federal geographic information systems (GIS). Statements B and D are true.

9. Answer: 3

When a drawing shows a side view of a project, these are called elevations; a section is shown when a drawing cuts vertically through a building to show the structure of a building assembly. A perspective is a three-dimensional representation of what the building would look like when built.

10. Answer: 4

Districts are comprised of more than one neighbourhood and incorporate district amenities. However, they are generally defined at their edges by major changes in land use. Therefore, districts would not usually have land that greatly differs in use.

11. Answer: 3

Vacancy rates and turnover rates are least likely to be an important characteristic in the analysis of a single family residential district. Vacancy rates and turnover rates are a much more important characteristic when considering the analysis of a multifamily apartment district, which relies on rental data and the income producing capability of this asset type.

12. Answer: 3

The Styrofoam block acts as a "spacer" so that the steel I-beam can be installed into the frame later.

13. Answer: 4

Both (1) and (2)

Note: all students will be marked correct for this question this term.

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14. Answer: 4

As described in the video series, this stud wall forms the frame for a load bearing wall that will help to support the structure above, and transfer the weight to the foundation below. It also acts as the side wall for the frame of the stairs that will go down into the basement. Option (3) is incorrect because this stud will is not temporary, and there will be no steel I-beam installed in this location.

15. Answer: 1

The groove in the footings provides additional surface area, and helps to "interlock" the poured foundation wall with the footing, thus reducing movement.

16. Answer : 4

The jack-post will support the main I-beam. Because of the large amount of weight that the jack-beam will be bearing, the square footing must be poured to transfer the weight from the jack-post down onto the earth below the foundation. Without this footing, the jackpost would likely sink further into the earth, causing the main I-beam to become unstable.

17. Answer: 3

8 inches

18. Answer: 1

Snap ties are the metal bars that are used to hold the wooden foundation form in place, and then can be snapped off after the concrete hardens. Rebar are larger steel rods or mesh placed in the concrete to increase its strength. Masonry clips are used to mount a structure into masonry, typically doors and windows. Form hinges are typically not used in foundations.

19. Answer: 2

The wooden board acts as an aid to level the basement concrete floor. It is clear that this board is not part of the building structure, and therefore is not associated with the foundation form, sill plate, or any stud walls.

20. Answer: 4

This tool is used to smooth and polish the cement floors as they harden. It cannot be used for compacting or leveling rough ground or a granular base. This tool is also too rough to be used on unfinished hardwood floors.

BUSI 400 – Answer Guide 2

CHAPTER 3: Site Factor Analysis
CHAPTER 4: House Design Analysis

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 3

   Statement A is correct; outdoor living areas should be adjacent to indoor informal areas for ease of interaction. Statement D is also correct as outdoor living areas can be either semi-public or private, as different cultures opt for different lifestyles. . Statements B and C are incorrect.

2. Answer: 3

   Caveats, easements, and local zoning are all legal considerations pertinent to site planning. Location of site services is an engineering consideration.

3. Answer: 4

   Masonry fences can be subject to frost heaving and are extremely vulnerable to soil movement due to their rigidity, and should thus be put on a structural foundation.

4. Answer: 3

   As a general rule, the simpler the roof, the lower the cost. Those with a variety of slopes and changes in roof design add to the cost. A shed roof has only one slope and no changes from the simple design.

5. Answer: 1

   Internal integration refers to the degree of consistency with colours, textures, and materials.

6. Answer: 3

   Outdoor living should be on the south side with a western exposure, and front doorways should face north or west away from winter wind. A south-east facing wind screen will block afternoon sun. Coniferous trees should not be planted in front of south facing windows because deciduous trees provide summer shade and allow winter sunlight.

7. Answer: 4

   Option (4) is correct; a bi-level house with a one-storey concept typically has all living components on the upper floor, a developable basement, and 'split' stairs for access to the living room by a half-flight of stairs from grade level. Option (1) is incorrect; a duplex contains two housing units that are situated side-by-side, over/under, or front/back. Option (2) is incorrect; an "L" shaped bungalow is an example of a one-storey dwelling that does not have stairs leading to the living area. Option (3) is incorrect; a split-level house typically has the living component at grade level, with a sleeping component located a half-level above or below.

8. Answer: 1

   Option (1) is correct; classical homes typically have flat roofs, symmetrical façade, fluted white columns, and open porches. Victorian style homes typically have a steep shingled roof, asymmetrical façade, and cookie cutter trim. Both Classical and Victorian style homes are considered traditional.

9. Answer: 2

Statement C is correct; multi-storey units usually have living/working space on the main level, and sleeping/hygiene on the upper. Statement D is also correct because less land is required in the construction of this unit type; allowing the increased intensity of land use, hence higher density housing seen in dense urban centres. Statement A is incorrect; the upper level floors are not accessible from grade level in multi-storey properties. Statement B is incorrect; zoning development bylaws and building codes regulate height restriction, which may impede view corridors.

10. Answer: 4

Option (4) is correct as outdoor living spaces are considered internal site considerations that have an active function. This type of area is an internal site consideration because the area is not affiliated or connected with surrounding sites. Also, outdoor living spaces have an active function as they involve the interactive or physical use of the area.

11. Answer: 4

Option (1) is false because plastics are not used for structural reinforcement. Option (2) is true as galvanizing is a technique used to prevent metals from rusting. Option (3) is false because asphalt can be applied in cold and hot temperatures if it is laid using a cold application.

12. Answer: 3

Statement A is false because one-storey bi-level properties typically have all component spaces on the upper level. Statement C is false as rooms in the basement or on the lower level of bi-level houses cannot be designed with skylights. Statement D is false as bi-level properties require less roofing than one-storey properties to shelter an area of equal size. Statement B is true because working and living areas are typically located on the upper level of bi-level houses on flat lots, but are located on the lower level if its lot is sloped.

13. Answer: 1

One-storey homes offer the most natural light and the option of vaulted ceilings as the building only contains one level. Although bi-level and split-levels can offer vaulted ceilings and skylights, they are restricted to either the upper level or living area.

14. Answer: 2

Option (2) is correct as row-houses have significant economies of construction compared to detached houses. Sewers and water mains are shorter, actual house construction costs are lower due to the shared cost of separation/party walls, and there are savings in external wall and roof costs due to shortened perimeter walls. More savings include the reduction in both the costs of installation and operation of heating since there is less external wall area in row-houses than in detached houses.

15. Answer: 2

Design issues that should be considered include: having adequate areas left over on site outside of house footprint for future development, space available in the appropriate place, and adequate services to future space, including electrical service. Areas do not need to be dug up until construction is ready to proceed.

16. Answer: 3

Statement A is correct; scale is the relationship of the part of the building to the whole building and to the human observer. Statement C is also correct as scale may be shaped by the configuration of the roof, the size and proportions of the windows; the texture and colour of the elevation materials; the width and proportion of stairs and railings; and many other factors. Statements B and D are both false.

17. Answer: 4

All of the listed options are major considerations in determining house style.

18. Answer: 1

Controlling access by pedestrians is a functional zoning problem.

19. Answer: 1

Statements A & D are true; developers will construct strata titled units to sell and recoup their money sooner, leaving less to chance and uncertainty. Strata units are generally of better quality since purchaser/owners are more particular and are often given different choices of quality finishes.
Statement B is false, townhouses and duplexes and even coach houses (in certain jurisdictions) may be strata titled. Statement C is false, a secondary suite is an additional use allowed within or attached to single family dwelling - title remains fee simple. Strata ownership cannot be registered against the title and sold separately.

20. Answer: 3

To maximize the rear yard privacy area, they should purchase a pie-shaped lot that has its smallest dimension at the front of the lot.

BUSI 400 – Answer Guide No. 3

Chapter 5: Structure

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 2

   Statements B and C are true; steel is equally strong under tension and compression, while concrete performs better under the force of compression. Statement A is false; tension is the pulling force, whereas compression is the squeezing force. Statement D is false; adding steel to a concrete beam improves both its tension capacity as well as its compression capacity.

2. Answer: 3

   Option (3) is correct; a balloon frame consists of studs that are set apart 300mm to 600mm, rises continuously from the first floor joists to the top plate on the second floor, and rests directly on the sill plate. Option (1) is incorrect; a platform frame is constructed over the exterior foundation walls and main beams, creating a platform upon which bearing stud walls are built. Option (2) is incorrect; a plank wall frame consists of lumber planks that are vertically erected to absorb loads, similar to the posts in post-and-beam construction. Option (4) is incorrect; studs are used in the construction of frames, but are not a type of frame.

3. Answer: 3

   Flat sawn grain in lumber tends to cause the wood to shrink and bend into a cup shape over time.

4. Answer: 4

   Option (4) is false as cohesion is a measure of a soil's strength due to its particles sticking to one another. The ease with which individual soil particles can be forced to slide past each other is called friction. The other three options are all true statements.

5. Answer: 4

   Option (4) is false; rafters and ceiling joists generally do not come prefabricated and are less structurally efficient. Trusses can carry loads across longer spans. In order to calculate the steepness and slope of the roofs in options (1) and (2), we need to observe the level of rise and divide it by the horizontal distance (i.e., slope of $6/12 = 0.5$). Options (1), (2), and (3) are all true.

6. Answer: 3

   Option (3) is correct; plywood is produced by laminating thin sheets of soft wood that are laid down in alternating patterns of 90 degrees. Option (1) is incorrect as particle board is a composite material formed by bonding small wood particles together under heat and pressure, using a urea formaldehyde binder. Option (2) is incorrect as waferboard is formed by bonding wood chips or flakes with glue under pressure. Option (4) is incorrect as oriented strand board is formed by bonding short wooden strands with glue under pressure.

7. Answer: 3

   A truss is an engineered, prefabricated roof or floor support structure.

8. Answer: 1

Only statement A is false as spread footing spreads structural loads from the grade beam until the weight per square unit of footing is lower than the bearing capacity of soil. Statements B, C, and D are all true.

9. Answer: 2

Option (2) is correct as particle board is best suited for subfloor applications. Option (1), aspenite or waferboard, is suitable for most sheathing application, but generally not suitable for subfloors. Option (3), parallam, is used to make high-strength, dimensionally stable structural elements such as beams or studs. Option (4), fibre board, has low racking resistance and virtually no bending resistance, which doesn't make it a suitable subfloor material; however, it can be used as sheathing material if supplemented by other stiffening materials).

10. Answer: 3

Statements A, B and D are correct. The header or lintel transfers the load from above the opening to the wall structure on either side; the space created between the vertical posts in post-and-beam framing can accommodate window placement, and prefabricated or panelized systems may be entire walls including windows, doors, and insulation. Statement C is incorrect as it relates toopenings in the floor in stairwell construction.

11. Answer: 4

Statements B and C are correct; platform frames are used in contemporary construction, and include the use of floor joists, headers, and subfloor sheathing. Statement A is incorrect as it describes balloon framing. Statement D is also incorrect as it describes a feature of the braced frame.

12. Answer: 2

Statements A and D are true; the soil's bearing capacity typically ranges from 5,000-20,000 kilograms per square metre and the downward force of the building's foundation must be in equilibrium with the soil's allowable bearing capacity for the building to be static. Statement B is false as soil's shear strength is not equal to its bearing capacity, rather it is a measure of it.. Statement C is also false as the building is under renovation, which suggests that the underlying soil may still deform by compression and settlement and that consolidation is not complete.

13. Answer: 2

A rafter is the structural member that supports the roof deck.

14. Answer: 1

A ceiling joist is the structural member that supports the ceiling finish.

15. Answer: 3

Option (3) is correct; retarding agents help slow down the curing process in extreme heat and improve workability. Option (1) is incorrect; air-entraining is the process of adding air bubbles to a concrete mix to improve the concrete's resistance to freeze-thaw cycles, not to lengthen curing time. Option (2) is incorrect; aggregate is usually the gravel or crushed rock and not a material added to concrete to improve its structural performance. Option (4) is incorrect; accelerators reduce the time to cure and increase the rate required for concrete strengthening, typically in colder weather for cost savings.

16. Answer: 4

    All of the above

17. Answer: 1

    Lintel

18. Answer: 1

    Hip roof

19. Answer: 1

    Defines edge for floor sill to the left, base for first brick course on the right

20. Answer: 3

    Permits a higher interior basement height

BUSI 400 - Answer Guide 4

CHAPTER 6: Building Envelope System

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 3

   Option (3) is false because fire resistance rating is the number of hours a given assembly willprevent the passage of smoke, heat, and flame. Flame spread rating describes how quickly flame spreads across the face of a material. The other three options are true.

2. Answer: 1

   Window sills should be kerfed (sawcut) to prevent capillary migration of water under the sill (moisture or weather barrier).

3. Answer: 4

   Air leakage causes water to be carried into and through the envelope system by air. Moisture condensing in the attic is from air leakage from the living space below.

4. Answer: 1

   Option (1) is correct. Options (2) and (3) are high density, rigid sheet materials mainly used for sheathing insulation on wall and floor surfaces. Option (4) is the most common type of insulation, and it is a pre-manufactured material that is sized to fit in a wall cavity.

5. Answer: 3

   Vapour diffusion causes vapour to exert a pressure with a tendency to equalize. Water may be deposited in the wall cavity by vapour passing through the wall assembly.

6. Answer: 2

   Capillary action will cause water to flow upwards, sometimes in defiance of gravity. This can cause water to move up a concrete wall from the ground.

7. Answer: 3

   The system described is likely a "rain screen" and does not represent improper construction. The cladding will deflect much of the rain and the holes permit controlled penetration of the air into the cavity behind the cladding. The air pressure in the cavity is the same as the windward pressure acting on the surface of the cladding. The pressurized cavity acts as a cushion to help deflect wind and rain. The trapped water in the cavity drains down and out through the holes at the bottom of the wall and drains away from the house.

8. Answer: 4

   All of the statements are true.

9. Answer: 2

   Option (2) is false because the polyethylene vapour barrier should be attached to the inside of the wall studs, preventing warm interior air from condensing within the wall assembly. The other three options are true.

10. Answer: 3

Carbon monoxide is colourless, odourless, and tasteless, and can cause impaired vision (as well as death). It is emitted from improperly sealed kerosene heaters, among other things.

11. Answer: 4

Option (4) is false; UFFI was banned in Canada in 1980, so no recent developments have used UFFI as insulation. Existing older buildings, however, may still have UFFI in the building cavities. By law, this must be disclosed to potential purchasers and in inspection or appraisal reports. Options (1) and (2) are true; UFFI can be detected by removing electrical outlet covers and examining the area next to them; UFFI can also be detected near pipe locations that could be susceptible to freezing, and by looking under windows for evidence of holes drilled for UFFI installation. Option (3) is true; UFFI is a foamed-in-place insulation that is sprayed into wall cavities and attics through small drilled holes.

12. Answer: 1

Option (1) is true. Option (2) is false because open-cell polyurethane has about twice the sound resistance as closed-cell foam. Option (3) is false because open-cell foam is lower density, provides a higher economic yield, and is therefore inversely related. Option (4) is false because open-cell foam is suitable for a controlled diffusion of moisture vapor.

13. Answer: 1

Option (1) is correct; radon gas is an odourless, colourless, and radioactive gas. It is released from soils and usually enters the house from air leakage in the basement or possibly in much smaller proportions from construction material. Option (2) is incorrect; formaldehyde is a colourless gas, BUT it is released from synthetic products, not from soils. Option (3) is incorrect; carbon monoxide is a colourless, odourless gas, BUT it is release from kerosene heaters or unvented gas appliances. Option (4) is incorrect; nitrogen dioxide is a colourless, odourless gas, BUT it is released from unvented combustion appliances.

14. Answer: 4

$Q = (40' \times 60')(70^{o} - 10^{o}) \div 12 = 12{,}000$ BTU/HR

15. Answer: 1

Walls: Area $= 2(40' \times 15') + 2(60' \times 15') - 2(3' \times 8') - 6(3' \times 6') = 2{,}844$ ft^2

Note: The area of wall construction is the total wall area minus doors and windows. The R values for the wall construction assembly can be found in Figure 6.2 of Chapter 6 in the course manual.

$Q = 2{,}844 \times (70^{o} - 10^{o}) \div 20 = 8{,}532$ BTU/HR

16. Answer: 2

$Q = (2 \times 3' \times 8')(70^{o} - 10^{o}) \div 4 = 720$ BTU/HR

17. Answer: 1

$Q = (6 \times 3' \times 6')(70^{o} - 10^{o}) \div 2 = 3{,}240$ BTU/HR

18. Answer: 4

Total heat loss = 12,000 + 8,532 + 3,240 + 720 = 24,492 BTU/HR

19. Answer: 2

The gas consumption with an 80% efficient furnace

= 24,492 ÷ .80 OR 24,492 × 1.25
= 30,615BTU/HR

20. Answer: 3

Cost = .030615 million BTU × 24 hrs × 61 days × $4.00
= $179.28 for the 2 month period

20 Total Marks

BUSI 400 – Answer Guide 5

Chapter 7: Service Systems

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 3

   Natural gas lines

2. Answer: 1

   Central air conditioner connection

3. Answer: 2

   Laundry washing machine connection

4. Answer: 2

   Sump pump

5. Answer: 4

   Statements A, B, and C are true; electrical heating systems allow each room or zone to be individually thermostatically controlled providing a range of heat and comfort levels, and achieve rates of 100% steady-state and seasonal efficiency since there is no heat lost from combustion, which is not the case when heat is provided by fuel air furnaces. Statement D is false; both efficiency rates are lower when a fuel oil system is used.

6. Answer: 1

   Option (1) is correct as convectors consist of a set of copper coils with attached aluminum fins, set within a metal casing that covers the element and directs air flow. Air is heated by the aluminum fins, which are heated by hot water running through the copper coils. Option (2) is incorrect as radiators are composed of a series of reservoirs through which high temperature water or steam is distributed. Option (3) is incorrect as radiant panels are heated through hot water distribution or electricity. Option (4) is incorrect as condensing boilers generate heat through combustion, using water for heat distribution.

7. Answer: 4

   Aluminum wiring does not conduct as well as copper and it oxidizes more easily.

8. Answer: 4

   If Randy's only concern is a high Energy Factor (EF), then he would likely choose an electric heat pump water heater (EF of 2.20). Option (1) is incorrect as a high-efficiency electric storage only has an EF of 0.95. Option (2) is incorrect as conventional gas storage has an EF of 0.60. Option (3) is also incorrect as demand gas with no pilot has an EF of 0.80.

9. Answer: 1

Statements B and C are true. A low- efficiency gas system operates at a steady-state efficiency of 80% and a seasonal efficiency of 55% to 60%. In order of efficiencies, natural draft furnaces are the least efficient utilizing open atmosphere combustion, whereas the induced draft (mid-efficiency system) incorporates the use of a fan that draws combustion gases through the heat exchanger, and in the case of a condensing furnace (high-efficiency system), a secondary heat exchanger extracts additional heat. Statement A is false because although technological advances have improved, a high percentage but not all of the heat is recovered by the secondary heat exchanger. Statement D is false since the condensing furnace system allows the use of standard polyvinyl chloride (PVC) piping to directly vent the furnace outside with no chimney required. The other two systems require a chimney.

10. Answer: 3

Option (3) is correct as a plumbing trap is a seal that prevent sewer gases from flowing into the house. Option (1) is incorrect as not all sprinklers will release water in the event of a fire, only those impacted by the flames. Option (2) is incorrect as energy costs related to solar water heating systems are significantly lower than other types of heating systems. Option (4) is incorrect as a catchwater system involves the collection of rainwater in cisterns, which channel the water through a filter and into the building.

11. Answer: 3

Statements B and C are false; geothermal heat provides constant heat throughout the year since the source of the heat is from the earth and the installation, whether it be vertical or horizontal, is buried below the frost line. Further, it does not depend on the seasonal air temperatures, and it may be used for both heating and cooling requirements. Statement A is true; given the efficiency of the system to produce more energy than it consumes, the upfront costs are recuperated over the long term. Statement D is true as deep drilling for vertical loop configuration impacts less developable land.

12. Answer: 2

Option (2) is correct as the drain waste vent (or DWV) is the main soil and vent stack. This vent pipe is used to maintain equal pressure in the drainage system. Vent pipes connected to the drainage system extend above the roof, and do not carry waste at any time.

13. Answer: 1

Watts = Volts × Amps
2400 = 120 × Amps
Amps = 20

An amperage of 20 is required for this circuit.

14. Answer: 2

W = VI, therefore
W=VI = 120 volts × 10 amps= 1,200 watts

15. Answer: 3

Energy = (2.4 kilowatts) × (5 hours) × (31 days) = 372 kilowatt-hours
Cost = (372 kwh) × ($.03/kwh) = $11.16 per month

16. Answer: 1

This question requires you to calculate the amount of amps generated at 12,000 watts and 120 volts. This is done by using the formula:

$$\text{Watts} = \text{Volts} \times \text{Amps}$$
$$12{,}000 = 120 \times \text{Amps}$$
$$\text{Amps} = 100$$

The house is 90 m2 and the Canadian Electrical Code requires a minimum amp capacity of 100 amps for a house over 80 square metres. This means that the electrical service capacity of this house does meet the Canadian Electrical Code.

17. Answer: 2

Option (2) is true. A hearth is the fireproof area in front of the fire box to protect the room from embers. Option (1) is false because the smoke chamber or "throat" is the area above the damper. The wood or coal is burned in the fire box. Option (3) is false because the flue is the inside of the chimney. The mantle is a frame or shelf located above the fire place opening. Option (4) is false because it is a damper that is an adjustable metal flap positioned in the narrow opening at the top of a fire box.

18. Answer: 4

Option (4) is a false statement; radiant heating systems are most effective when embedded in concrete floors, as the concrete acts as a heat sink to provide stable temperatures. All other statements are true.

19. Answer: 3

Statements A and D are true. Statement B is false; one of the major problems with air source heat pumps is that they become less functional in subzero temperatures. Statement C is false as an upgrade to 200 amp service is a consideration when retrofitting an older home.

20. Answer: 2

Option (2) is false because a simple holding tank is another option for waste water disposal when there is no public system available. The other three options are all true.

BUSI 400 – Answer Guide 6

Chapter 8: Finishes and Fitments

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 2

   Out of the available options, epoxy paint would best suit Eduard's needs because it is very hard and offers the best scrubbable surface. All other options would not be as durable and scrubbable as epoxy paint.

2. Answer: 4

   All of the options are reasons why drywall has become popular for interior wall finish.

3. Answer: 3

   Alkyd primer is an undercoat for use on raw wood, but it cannot be applied directly on drywall. Option (1) is incorrect; new latex paints can be applied over anything, including alkyds. Option (2) is incorrect; epoxy paint has a harsh odour during application.

4. Answer: 2

   Option (2) is false because hardwood veneer is a valid choice for interior finish. Option (1) is true; ¼" thick wood veneer requires some kind of back up material, such as drywall. Option (3) is true; no back up material is required as long as the hardwood veneer board is at least 3/8" thick.

5. Answer: 4

   Loomed carpet construction is a variation of punched construction with a full rubber backing. Hence this style of carpet is suitable for outdoor use.

6. Answer: 3

   Sound transmission (STC) ratings can be improved by any of the following four methods:

   (i) adding more mass or weight, such as adding a second layer of drywall to the wall of the rec room.
   (ii) adding sound absorbing material, such as fibreglass insulation, to the space between the walls.
   (iii) separating the surfaces by offsetting studs, or adding a resilient furring channel to the underside of the studs, so that sound cannot travel through studs into the wall.
   (iv) sealing all openings in the wall assembly so that sound cannot travel airborne through openings.

   Hence, Statements B, C, and D are all appropriate methods for reducing the Sound Transmission Class number and Impact Insulation Class number for floors, walls, and ceilings. Statement A is inappropriate because removing mass or material from a wall would increase the noise travelling through the wall.

7. Answer: 4

   Lime-Keene's cement plaster is resistant to cracking, and is the best finish coat for areas of high humidity. All other plaster types are less resistant to humidity.

8. Answer: 2

The foil component of the foil-backed gypsum lath acts as a vapour barrier. All other laths form a bridge between structural elements without forming a vapour barrier.

9. Answer: 2

ENERGY STAR® clothes washers save an average of 7,000 gallons of water per year, not 700.

10. Answer: 2

Varnish is used primarily for its hardness, impermeability, and resistance to alcohol, alkalis, or acid. It is also used for highly polished furniture finishes.

11. Answer: 2

Penetrating oil is often used for woodwork and needs to be retreated often, possibly once a year.

12. Answer: 1

Ceiling tiles are well-utilized in laundry areas and utility rooms as they give an opportunity to access the space above the ceiling and offer the possibility of do-it-yourself economy.

13. Answer: 3

Option (3) is false because the National Building Code does not require any acoustic considerations within a dwelling unit. However, it does regulate acoustic qualities of the walls between attached units (Option (2)). Options (1) and (4) are also true; impact is one of the three ways sound can be transmitted, and a higher Impact Insulation Class (IIC) number indicates a better construction and reduced transmission of sound.

14. Answer: 3

Use of the dartboard would result in impact transmission as the darts strike the wall.

15. Answer: 3

Option (3) is correct. Using two rows of studs on a single plate (staggering the studs) will improve the sound rating of the wall.

16. Answer: 2

The scale of the STC rating is similar to the decibel scale, so an increase of 10 is a decrease in sound energy of 10 times. However, this is perceived by the human ear to be one-half of the volume. Because this would seem to the human ear to be 4 times as loud, it would be a decrease of 20 on the STC scale.

17. Answer: 2

Strip flooring suffers less from swelling and shrinking caused by moisture because it is narrower.

18. Answer: 1

Latex paint is water-based and cleans up easily with just water. Matte gloss is the least shiny, and hides imperfections.

19. Answer: 2

The minimum run is 210 mm and the minimum tread is 235 mm, so these stairs do not meet the run or tread requirements in the National Building Code.

20. Answer: 3

Masonry is considered a solid wall material.

BUSI 400 – Answer Guide 7

Chapter 9: Exterior Analysis
Chapter 10: Basement Analysis

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 2

   Option (2); heaving and settling of soils are forms of differential soil movement and are usually the cause of uneven structural issues in homes. It is also worth noting that because Janice's house is located on a hillside, it may have been more susceptible to differential soil movement.

2. Answer: 4

   Statement C is true. Statement A is false since the exterior walls typically provide the majority of the required structural support, and interior walls are rarely depended upon for this purpose. Statement B is false because a lack of ventilation does not cause cracks in the outside walls of a house. Statement D is false because a sharp crack indicates recent damage, but does not indicate the cause.

3. Answer: 3

   Statement A is false because square metres can be calculated by dividing the number of square feet by approximately 10.76. Statement C is false because for detached houses, measurements are taken from the outside surfaces of exterior walls. Statement D is false because ANSI standards specify that a distinction is to be made between finished and unfinished floor area. Statement B is true.

4. Answer: 2

   Corroded copper pipes turn pipe joints and the water running through them a blue/green colour. Brown-coloured tap water that tastes rusty is the result of corroding galvanized steel pipe joints and fittings. Worn out gaskets and washers cause leaks out of the cold water supply system but don't cause colour changes in water. Lead piping is used in waste water systems and not for cold water supply.

5. Answer: 4

   All of the options would increase the energy efficiency of a home.

6. Answer: 2

   A and C could be discovered by an external visual inspection. A can be found by lining up the vertical edge of the building against a reference point of a structure behind the home being inspected. C can be found by looking across the roof using binoculars. B and D would require an internal inspection to be discovered.

7. Answer: 3

   Statements B, C, D, and E are all true. Statement A is false because flooring is generally installed over a wood or concrete subfloor, and carpet generally has a layer of foam underlay as well.

8. Answer: 3

Option (3) is correct because efflorescence is white staining resulting from dissolved salts in water precipitating out onto the parging surface. Options (1), (2), and (4) are incorrect as cracks in the foundation can result from settling, penetration of frost under the foundation, improper installation of footings during original construction, lack of or improperly operating perimeter drainage system, or earthquakes.

9. Answer: 1

Option (1) is false because the "hole punch" windows indicate that the wall is a bearing frame wall (conventional stud wall). Option (2) is true, with the siding providing a weather barrier. Option (3) is true, indicating that the roof construction is built-up tar and gravel. Finally, option (4) is also true as the weight of the water can lead to structural problems.

10. Answer: 3

Option (3) is correct because water sitting in stagnant ponds on the roof indicates that areas of the roof do not slope to drain. This may be caused by sagging roof beams or crushed insulation and may be remedied by the replacement of either.

11. Answer: 1

Option (1) is correct because the sagging plywood soffit indicates that water is being deposited in the space above the soffit. This is likely caused by poor (or non-existent) air and vapour barriers, which permit condensation to occur.

12. Answer: 4

Option (4) is correct as fogging of the glazing (windows) indicates poor thermal performance of the glazing system, which permits the humid inside air to condense on the cool glass surface. This problem is moderately difficult to repair. If the fogging is in the glazing unit between the panes of glass, the hermetic seal is broken and the glazing unit must be replaced.

13. Answer: 4

The minor water stain under the window sill is likely caused by a poor drip detail, which means that the sill is not properly shedding water. This is likely a minor problem that can be remedied by sawing a kerf (small slit).

14. Answer: 3

Option (3) is true. Option (1) is false because the primary difference between basements and crawlspaces is ceiling height. Option (2) is false because "fishmouth" describes roof shingles that have lifted in the middle. Option (4) is false because building paper is found on exterior walls between the exterior wall finish and the sheathing. Its primary purpose is to shed water from the internal wall assembly.

15. Answer: 1

It is recommended that students draw a sketch to aid in calculating the living area. The area calculation is as follows:

- the area of the main floor is $(6 \times 11) + (3.75 \times 4) + (4 \times 8) = 113$ square metres
- total area is 113 square metres
- only the main floor is included in the living area

16. Answer: 2

This question requires one to determine the dimensions of a house given the measurements. First, a diagram should be drawn. The top storey has the same dimensions as the main floor, except that the main floor has two bay windows of 1.5 × 2 metres each. The area of the main floor (without the bay windows) is 163.5 square metres [(13.2 × 10) + (3.15 × 10)]. The total floor area of the house is (2 × 163.5) + (2 × 3.0) = 333 m2. This can be converted to square feet by multiplying by a factor of 10.76 to arrive at 3,583 ft2.

17. Answer: 3

(12 X 18) + (12 X 6) + ((10+ 6)/2 X 1 = 296 m2

18. Answer: 1

Option (1) is correct as the consultant would recommend installing an air barrier, increasing ventilation in the attic, or installing eave protection. Statement C is incorrect as the consultant would not recommend installing 'fishmouth' shingles. This is because 'fishmouth' describes a shingle that has lifted slightly from the roof and leads to a weakened roof.

19. Answer: 1

Option (1) is correct, since this problem is most likely caused by rain penetration through small holes where the floor meets the wall. The negative pressure in a basement caused by the stack effect may aggravate the condition by sucking in outside air. If the basement is under positive pressure due to a mechanical air supply system, this condition can also be caused by air escaping, causing dew point condensation. The solution can be to install a new air barrier in the header area and seal (caulk) any holes in the weather barrier. This condition may also be caused by condensation of humid basement air on cold framing members and can be remedied by installing a vapour barrier on the warm side of the basement wall insulation and reducing the humidity in the basement.

20. Answer: 1

This problem can be solved by underpinning the affected wall, resealing the outside finish, and refinishing the inside wall.

BUSI 400

Answer Guide 8

Chapter 11: Upper Floors and Attic Analysis
Chapter 12: Doing an Appraisal

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 1

   Post and beam structures accommodate vertical loads well, but are less reliable at handling horizontal loads.

2. Answer: 4

   Smoke sticks are commonly used to test for air leakage in a building's air barrier system.

3. Answer: 2

   The best solution to fix a squeak under a carpeted floor located on top of a finished ceiling is to tap on the floor to find the joist and nail through the carpet with ring shank nails. It is preferable to use nails with small heads to reduce visibility. Option (1) may be considered if there was no ceiling below the floor, and then the space between the joist and the subfloor can be shimmed to tighten the joint and stop the squeak. Options (3) and (4) are not reasonable solutions, especially since he is planning to put his house on the market.

4. Answer: 3

   Option (1) is false because flat roof assemblies are used for homes with flat ceilings and flat roofs. Option (2) is false because an attic is not likely to exist when the ceiling and the roof is sloped to the same degree. Option (4) is false because a shed construction requires the roof and ceiling to have the same degree slope.

5. Answer: 4

   The four main steps to residential appraisals, in order of completion, are: research, inspection, evaluation, reporting.

6. Answer: 2

   It is considered a design defect where the bathroom is located directly off the living room, and when the door is open, provides a view of the toilet. Other design defects in a home could be inadequate lighting, exceptionally small room area, and doors that interfere when opened.

7. Answer: 3

   Options A, B, and D are all signs of potentially serious health and structural problems with the basement. Ceiling heights below seven feet are not considered serious problems with a basement.

8. Answer: 3

   Closets that have difficulties opening and closing are considered visible defects, rather than invisible defects.

9. Answer: 1

A plumb bob is a weight attached to a string, and can be used to ensure walls and columns are vertical.

10. Answer: 3

Collapse of the structure itself is not the major effect of structural failures in residence. Instead, the major effect is damage to the envelope system.

11. Answer: 2

Insulation is difficult to inspect because it is usually covered by the wall finish and siding, except in the attic space. The condition in the attic area can be checked though the attic accesshatch. In the walls, the only way to inspect the quality of the insulation is to survey the wall surface for signs of dampness or mould.

12. Answer: 3

Ventilation is often restricted, not increased, in attics which can cause more severe condensation.

13. Answer: 4

Drywall and plaster appear similar when finished. Plaster will be cooler to the touch generally and have a more solid sound when tapped with a knuckle.

14. Answer: 4

The neighbourhood analysis examines the neighbourhood that a subject property is located in. This property inspection investigates and rationalizes the physical, social, political, demographic, and economic characteristics of a neighbourhood.

15. Answer: 1

Badly discoloured or water stained drywall or ceiling tiles may be caused by a water leak through the attic vapour barrier, a leaking plumbing or drain connection, or condensation from a cold water line. This can be remedied by repairing the vapour barrier and resealing, improving the venting of the attic and checking for roof leaks, repairing plumbing or drain problems and insulating the cold water lines, and repainting or replacement of drywall or tiles.

16. Answer: 1

Warped studs or inconsistent joist depths may cause nail popping. This can be resolved by screw fastening or installation of strapping. Shrinkage of "green" lumber perpendicular to the grain may force the nails to move outward and pop out of the drywall. This may be remedied by installing screw fasteners. The use of longer fasteners can cause nail pops and can be remedied by replacing them with shorter fasteners and possibly double-fixing them.

17. Answer: 3

Mould and mildew may be caused by excessive humidity inside the house and may be remedied by improving exhaust ventilation and reducing humidity sources. Mouldy window frames may also be caused by poor air circulation around the window and may be remedied by ensuring that an unobstructed air supply be directed at the window (similar to the fogging of the front windshield of a car). Another possible cause for mould and mildew may be air leakage through the window assembly and may be solved by sealing the joints around the frame or installing a new, approved window.

18. Answer: 4

The placement of a kitchen near the main entrance is not a design defect.

19. Answer: 1

The appraiser must use extreme caution to avoid significantly overvaluing the property's current incomplete state when they conduct progress inspections. It is common to apply the percentage complete to the total estimated construction cost, which may provide a value significantly greater than the actual value of the property in its existing "as is" condition.

20. Answer: 1

The two areas of the house that are most likely to reveal information important in an inspection are the basement and the attic. The basement holds the most potential because it can show: structural movement; dampness; electrical, plumbing and heating information; and the presence of asbestos. The second most important area is the attic, which can reveal any penetrations, the amount of ventilation, the condition of the framing, any evidence of moisture, and any indication of the presence of insects or rodents.