BUSI 400

Answer Guide No. 4

CHAPTER 6: Building Envelope System

This assignment is a Multiple Choice Assignment

Marks: 1 mark per question.

1. Answer: 4
   $Q = (50' \times 50')(70^{o} - 20^{o}) \div 12 = 10{,}417$ BTU/HR

2. Answer: 1
   Walls: Area $= 4 \times 50' \times 15' - (2 \times 3' \times 7') - (6 \times 4' \times 5') = 2{,}838$ sq. ft.

   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 2 of Chapter 6 in the course manual.

   $Q = 2{,}838 \times (70^{o} - 20^{o}) \div 20 = 7{,}095$ BTU/HR

3. Answer: 2
   $Q = (2 \times 3' \times 7')(70^{o} - 20^{o}) \div 3 = 700$ BTU/HR

4. Answer: 1
   $Q = (6 \times 4' \times 5')(70^{o} - 20^{o}) \div 1 = 6{,}000$ BTU/HR

5. Answer: 4
   Total heat loss $= 10{,}417 + 7{,}095 + 6{,}000 + 700 = 24{,}212$ BTU/HR

6. Answer: 2
   The gas consumption with an 80% efficient furnace
   $= 24{,}212 \div .80$ OR $24{,}212 \times 1.25$
   $= 30{,}265$ BTU/HR.

7. Answer: 1
   Cost $= .030265$ million btu $\times$ 24 hrs $\times$ 61 days $\times$ \$5.00
   = \$221.54 for the 2 month period

8. Answer: 2
   The joints between the window frame and the fixed glazing must be sealed to structurally secure the glass.

9. Answer: 2
   Window sills must be extended past the wall to enable water to drip away from the wall (moisture or weather barrier).

10. Answer: 1
    Window sills should be kerfed (sawcut) to prevent capillary migration of water under the sill (moisture or weather barrier).

11. Answer: 3

Gravity would cause the "downhill" flow of water through the faulty roof shingles into the attic, and would not induce water into a wall from the ground or cause warm air to rise into the attic to condense.

12. 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.

13. 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.

14. 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.

15. 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.

16. Answer: 4
All of the statements are true.

17. Answer: 1
Option (1) 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.

18. 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.

19. Answer: 1
Option (1) is false because fire resistance rating is the number of hours a given assembly will prevent 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.

20. Answer: 3
Double hung vertical sliders are the least efficient of the windows listed and should not be recommended.

20 Total Marks