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BUILDING MATERIALS

CIVIL ENGINEERING

Date of Test : 18/10/2024

ANSWER KEY >

- | | | | | |
|--------|---------|---------|---------|---------|
| 1. (a) | 6. (a) | 11. (c) | 16. (c) | 21. (b) |
| 2. (c) | 7. (a) | 12. (c) | 17. (d) | 22. (c) |
| 3. (d) | 8. (d) | 13. (b) | 18. (c) | 23. (c) |
| 4. (b) | 9. (d) | 14. (d) | 19. (d) | 24. (d) |
| 5. (d) | 10. (a) | 15. (c) | 20. (d) | 25. (c) |

DETAILED EXPLANATIONS

1. (a)

The raw materials used for manufacturing of high alumina cement are limestone and bauxite.

2. (c)

1 m³ freshly mixed concrete corresponds to 1.54 m³ dry volume of concrete.

Summation of proportions = 1 + 2 + 4 = 7

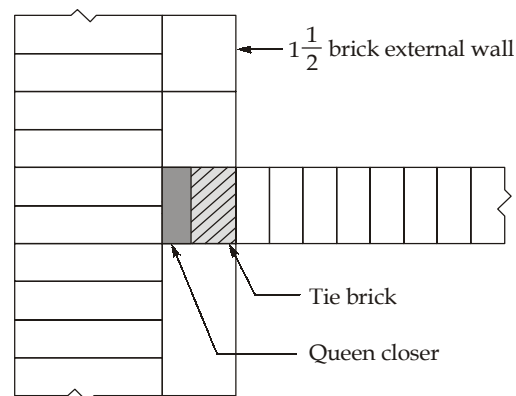
$$\therefore \text{Volume of cement} = \frac{1.54}{7} = 0.22 \text{ m}^3$$

$$\text{Volume of sand} = \frac{2}{7} \times 1.54 = 0.44 \text{ m}^3$$

3. (d)

Rebound hammer test is a non-destructive test used to determine the strength of hardened concrete by noting the rebound deflection when the concrete is hit with plunger, strength of hardened concrete is assessed.

4. (b)



5. (d)

Brard's test is performed to check the frost resistance of stone.

6. (a)

7. (a)

$$\text{Mean dimension} = \frac{60 + 50}{2} = 55 \text{ mm}$$

$$\text{Slot for flakiness index} = \frac{3}{5} \times 55 = 33 \text{ mm}$$

8. (d)

9. (d)

10. (a)

11. (c)

Lime mortar is generally made with hydraulic lime.

12. (c)

We know that cross-section area of briquette at its least section is 6.45 cm^2 .

$$\text{So ultimate tensile strength} = \frac{\text{Failure load}}{6.45} = \frac{161.25}{6.45} = 25 \text{ kg/cm}^2$$

13. (b)

1 m^3 of wet cement mortar = 1.25 m^3 of dry mortar

Sum of proportions = $1 + 6 = 7$

$$\therefore \text{Volume of cement} = \frac{1.25}{7} = 0.17857 \text{ m}^3$$

$$\therefore 0.17857 \text{ m}^3 \text{ of cement} = \frac{50}{0.0347} \times 0.17857 = 257.3 \text{ kg cement}$$

$$\text{Volume of sand} = \frac{6 \times 1.25}{7} = 1.07 \text{ m}^3$$

14. (d)

15. (c)

In industrial areas, the acidic rain water reacts with the constituents of stones leading to its deterioration.

16. (c)

17. (d)

Wane is a defect arises due to conversion, denoted by the presence of original round surface on the manufactured piece of timber.

18. (c)

To prepare 2.5 m^3 workable RCC mix,

$$\text{Volume of dry concrete} = 1.53 \times 2.5 = 3.825 \text{ m}^3$$

$$V_{\text{cement}} = \frac{1}{7} \times 3.825 = 0.546 \text{ m}^3$$

$$\text{Number of bags} = \frac{0.546}{0.347} = 15.74 \approx 16$$

19. (d)

20. (d)
- High alumina cement is not a type of portland cement and its predominant compound is mainly CA (monocalcium aluminate) in place of calcium silicates of portland cement.
 - Hydrophobic cements are suitable for large transportation periods and long storage durations while quick setting cement are most suitable for tremie concreting.
21. (b)
- Flemish bond has more number of joints than English bond.
22. (c)
- Electrical seasoning method uses the application of AC currents through a bad conductor causes heating leads to rapid drying of the timber. Due to uniform rise in temperature and consequently uniform evaporation of moisture, results in uniform quality of timber.
23. (c)
24. (d)
- In dry process, raw ingredients are pre-heated by exhaust gases at 800°C which reduces the cost of fuel used in kiln to attain the required temperature.
 - In wet process, cost of excavating and grinding of raw materials is low while the fuel consumptions cost is high as there is no preheating done in wet process.
25. (c)
- Angularity number varies in the range between 0 to 11.
 - LA abrasion test is used to find hardness of the aggregates.

