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# BUILDING MATERIALS

## CIVIL ENGINEERING

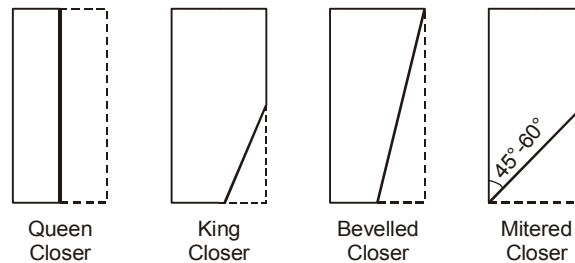
Date of Test : 08/07/2022

### ANSWER KEY >

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

1. (d)  
Silica affect final setting time, Sulphur impart unsoundness and Alkali and  $C_3A$  causes flash set.

2. (d)



3. (c)
- High water cement will result into occurrence of excess water at top surface of concrete.
  - Excess compaction leads to bleeding.

4. (c)
- White patches over steam signifies druxiness.
  - Abnormal growth or projection signifies burls
  - Crushed fiber in transverse direction are upsets.
  - Yellow-red tinge surrounding heartwood signifies Foxiness.

6. (c)

Consistency	Slump (mm)
Moist	0
Very dry	0 - 25
Dry	25 - 50
Plastic	50 - 100
Semi fluid	100 - 175

7. (d)
- Use of lime makes the paste more plastic in nature hence increases workability and water rententivity.
  - Use of two binding material, induces better binding property in mortar and imparts better resistance against frost action.

8. (c)

$$M = t \times 24 \times [T - (-11)]$$

$$0.6 \times 19800 = 15 \times 24 \times [T - (-11)]$$

$$T = 22^\circ\text{C}$$

9. (b)  
Sheesham is deciduous tree, contains distinct medullary rays.

10. (d)  
Excess alumina absorb water and impart crack during drying.

11. (b)

- Excess mixing causes bleeding.
- Smaller the size of cube, more than strength but far from true value.
- Rough angular aggregate impart better strength due to interlocking.

12. (b)

Class B lime is semi hydraulic lime contains clay percentage on lesser side, i.e. 8% - 15%, results in slower rate of slacking and setting.

13. (d)

Excess of lime cause crack over brick surface, due to formation of  $\text{Ca}(\text{OH})_2$  after reacting with moisture, known as checks.

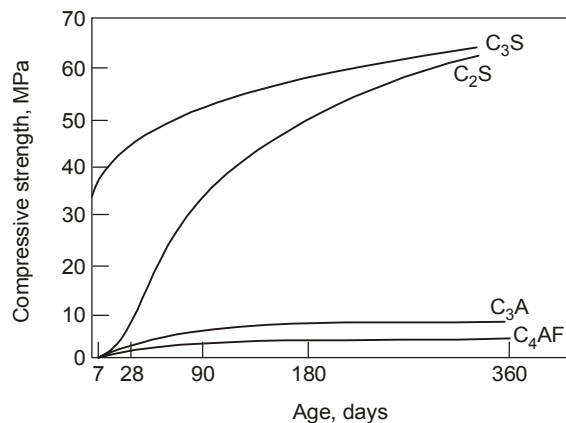
14. (b)

$$\begin{aligned} \text{Number of bricks} &= \frac{1 \times 10^6}{(23 + 1) \times (11.6 + 1) \times (7.4 + 1)} \\ &= 393.67 \end{aligned}$$

$$\text{Volume of bricks} = 393.67 \times 23 \times 11.6 \times 7.4 \times 10^{-6} = 0.7772 \text{ m}^3$$

$$\text{Volume of Mortar} = 1 - 0.7772 = 0.2227 \text{ m}^3$$

15. (b)



16. (b)

- Portland pozzolana cement is combination of cement clinker and granulated blast furnace slag as pozzolonic material, so known as binary cement.
- RHC is finer OPC with higher  $\text{C}_3\text{S}$ .
- Sulphate resisting is finer OPC with less  $\text{C}_3\text{A}$ .

17. (c)

- High refractory timber are very difficult to seasons.
- Application of sodium silicate, known as Sir Able's process, used to make timber fire resistive.

18. (b)

- Ferrocement is prepared by cement mortar retains mesh fo steel wires of diameter 0.5 - 1 mm.
- Alumina works as flux and reduces temperature required to fuse lime and silica together during burning.

19. (b)

$$\text{Weight of } 1 \text{ m}^3 \text{ concrete mix} = 2500 \text{ kg}$$

$$2500 = C + 3 C + 5.5 C + 0.5 C$$

$$C = \frac{2500}{1 + 3 + 5.5 + 0.5} = 250 \text{ kg}$$

$$\text{Number of cement bags} = \frac{250}{50} = 5 \text{ bags}$$

20. (c)

- Setting time for PPC and RHC is same, as both are fiber than OPC.
- For QSC it is just 5 minutes.
- LHC has less amount of  $C_3A$ , which delayed initial set.

21. (b)

- Cup shake occurs due to frost action on sap when tree is young.
- Heat skake is due to shrinkage of heart wood of over matured tree.
- End split is due to evapouration of sap at end of grain of log.

22. (c)

Sound absorbing mortar are light weight mortar ( $600 - 1200 \text{ kg/m}^3$ ) prepared with cement and light weight aggregates like pumice, caustic magnesite, clinder etc.

23. (c)

Lower water powder ratio imparts strength and replacing cement with fly ash helps in enhancing workability.

24. (a)

- $C_3A$  reduced in LHC in order to reduce heat but it also reduces rate of setting
- $C_2S$  increased in order to compensate loss of strength, but it reduces rate of gain in strength.

25. (d)

Bacterial concrete is prepared by adding calcium lactate, forms precipitate of celcite, which heals the cracks itself.

