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BUILDING MATERIALS

CIVIL ENGINEERING

Date of Test : 30/09/2025

ANSWER KEY >

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

DETAILED EXPLANATIONS

1. (a)

2. (a)

3. (d)

4. (b)

Let quantity of fine sand = x

∴ Quantity of coarse aggregate = $(1 - x)$

Let total quantity of (F.A + C.A) = 1

$$(F.M)_{F.A} \times (Qty)_{F.A} + (F.M)_{C.A} \times (Qty)_{C.A} = (Qty)_{(F.A+C.A)} \times (F.M)_{\text{mixed}}$$

$$\therefore (x \times 2.8) + (1 - x) (7.6) = 1 \times 6.4$$

$$\Rightarrow x = 0.25$$

$$\therefore x = 25\%$$

$$\therefore [F.A : C.A] = [25\% : 75\%] = [1 : 3]$$

$$\therefore \text{Proportion of f.A is } \frac{1}{3} \times 100 = 33\%$$

5. (b)

If sand quantity is “ x ” in given quantity of mortar therefore if x quantity is increased then binding material will be insufficient to bind the given quantities, quantity of sand in mortar, thereby shrinkage will also reduced during setting.

6. (c)

7. (d)

8. (c)

C.F. > 0.95, represent high workable concrete although the C.F. Test conducted on dry concrete/low workable concretes.

9. (d)

Minimum compressive strength of first class brick is 10 N/mm².

10. (a)

11. (d)

12. (b)

13. (d)

14. (a)

15. (c)

Let weight of cement = W_c kg

Weight of sand = W_s kg

Weight of aggregate = W_a kg

Net volume of concrete = Total volume as concrete – Volume of air in concrete

$$= 0.25 - 0.25 \times 0.02 = 0.245 \text{ m}^3$$

Net volume of concrete = Volume of water + Volume of solids

$$0.245 = \frac{\text{Weight of water}}{\text{Density of water}} + \frac{\text{Weight of solids}}{\text{Density of solids}}$$

$$\Rightarrow 0.245 = \frac{0.5W_c}{1000} + \left[\frac{W_c}{3.15 \times 1000} + \frac{W_s}{2.65 \times 1000} + \frac{W_a}{2.7 \times 1000} \right]$$

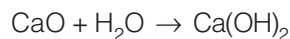
$$\Rightarrow 0.245 = \frac{0.5W_c}{1000} + \left[\frac{W_c}{3.15 \times 1000} + \frac{2W_c}{2.65 \times 1000} + \frac{3W_c}{2.7 \times 1000} \right]$$

$$\therefore W_c = 91.30 \text{ kg}$$

16. (b)

17. (b)

18. (c)



\therefore 56 g of CaO requires 18 g of water

\therefore 10 g of CaO will require $\frac{18}{56} \times 10 \text{ kg} = 3.2 \text{ kg}$ of water

19. (c)

Pulse velocity decreases with increase in temperature and increases below freezing temperature.

20. (b)

21. (d)

22. (d)

As per Table 9, IS 456:2000, for M20 it is 250 kg.

23. (c)

24. (c)

Rough aggregate surface results in stronger bond.

Vermiculite is an artificial light weight aggregate which produces low strength and high-shrinkage concrete.

25. (a)

Quick lime also known as fat lime, rich lime, pure lime or white lime slakes vigorously on addition of water.

