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Building Material

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CLASS TEST 2019-2020

CIVIL ENGINEERING

Date of Test : 29/06/2019

ANSWER KEY ➤ Building Material

1.	(a)	7.	(c)	13.	(d)	19.	(d)	25.	(b)
2.	(b)	8.	(d)	14.	(d)	20.	(c)	26.	(a)
3.	(a)	9.	(b)	15.	(d)	21.	(d)	27.	(d)
4.	(c)	10.	(d)	16.	(c)	22.	(b)	28.	(a)
5.	(b)	11.	(b)	17.	(b)	23.	(c)	29.	(d)
6.	(b)	12.	(a)	18.	(c)	24.	(d)	30.	(b)

Detailed Explanations

9.   (b)

Due to more water absorption property of bricks, stone work is more water tight.

11.   (b)

$$\text{Let quantity of find sand} = x$$
$$\therefore \qquad \text{Quantity of coarse aggregate} = (1-x)$$
$$\text{Let total quantity of (F.A + C.A)} = 1$$
$$(F.M)_{F.A} \times (Qty)_{F.A} \times (F.M)_{C.A} \times (Qty)_{C.A} = (Qty)_{(F.A+C.A)} \times (F.M)_{mixed}$$
$$\therefore \qquad (x \times 2.8) + (1-x)(6.4) = 1 \times 7.6$$
$$\Rightarrow \qquad x = 0.25$$
$$\therefore \qquad x = 25\%$$
$$\therefore \qquad [F.A : C.A] = [25\% : 75\%] = [1 : 3]$$
$$\therefore \qquad \text{Proportion of f.A is } \frac{1}{3} \times 100 = 33.33\%$$

16.   (c)

The need to prepare sulphate resisting cement is the proneness of OPC towards sulphur.

The main constituents of OPC that are valuable to sulphur are C_3A and C_4AF. The ideal way to prepare sulphate resisting cement will be by reducing the concentration of Al_2O_3 in raw material which will eventually produce less C_3A and C_4AF but concentration of Al_2O_3 cannot be reduced feasibly.

So, excess Fe_2O_3 is added in raw material which results in the formation C_4AF at the expense of C_3A and C_4AF is less vulnerable to sulphate attack as compared to C_3A.

17.   (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.

20.   (c)

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

21.   (d)

Minimum compressive strength of first class brick is 10 N/mm^2.

22.   (b)

Bleeding is the mechanism/defect in concrete where denser particles get settled down and lighter particles/ material of concrete floats on the surface of denser mass of concrete and therefore due to "Excess quantity of coarse aggregate" may cause segregation in concrete.

23.   (c)

The rebound hammer test measures the elastic rebound of concrete. The rebound number is correlated with compressive strength of concrete. The variation of strength of a properly calibrated hammer may lie between $\pm 15\%$ and $\pm 20\%$.

24. (d)

High alumina cement never used along with admixture because it itself impart rapid gain of strength with maximum heat of hydration and if any admixture is added, it will produce cracks in structure.

29. (d)

$E_c = 5000\sqrt{f_{ck}}$, where f_{ck} : characteristics compressive strength

- Hardness increases, Brittleness of concrete increases.
- Compressive strength and shear strength are dependent to each other, if compressive strength increases shear strength also increases.

30. (b)

Here, Let "F.A" quantity is $= x$ in a mix of C.A and F.A

| Given, | Quantity of C.A. | $= 1$ |

$\therefore$ Total quantity of (C.A + F.A) $= (1 + x)$

$\therefore$ $(1 + x) \times 6.14 = x + 2.78 + 1 \times 7.82$

$x = 0.50 \approx 50\%$ fine aggregate quantity.

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