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Q : 1) To determine the modulus of rupture, the size of test specimen used is

A : 150 x 150 x 500 mm

B : 100 x 100 x 700 mm

C : 150 x 150 x 700 mm

D : 100 x 100 x 500 mm

Q : 2) The property of fresh concrete, in which the water in the mix tends to rise to the surface while placing and compacting, is called

A : Segregation

B : Bleeding

C : Bulking

D : Creep

Q : 3) Select the incorrect statement

A : Lean mixes bleed more as compared to rich ones.

B : Bleeding can be minimized by adding pozzolana finer aggregate.

C : Bleeding can be increased by addition of calcium chloride.

D : None of the above

Q : 4) The property of the ingredients to separate from each other while placing the concrete is called

A : Segregation

B : Compaction

C : Shrinkage

D : Bulking

Q : 5) Workability of concrete is directly proportional to

A : Aggregate cement ratio

B : Time of transit

C : Grading of the aggregate

D : All of above

Q : 6) Workability of concrete is inversely proportional to

A : Time of transit

B : Water-cement ratio

C : The air in the mix

D : Size of aggregate

Q : 7) Approximate value of shrinkage strain in concrete , is

A : 0.003

B : 0.0003

C : 0.00003

D : 0.03

Q : 8) Air entrainment in the concrete increases

A : Workability

B : Strength

C : The effects of temperature variations

D : The unit weight

Q : 9) The relation between modulus of rupture f_{cr} , splitting strength f_{cs} and direct tensile strength f_{ct} is given by

A : $f_{cr} = f_{cs} = f_{ct}$

B : $f_{cr} > f_{cs} > f_{ct}$

C : $f_{cr} < f_{cs} < f_{ct}$

D : $f_{cr} > f_{cs} > f_{ct}$

Q : 10) The approximate value of the ratio between direct tensile strength and flexural strength is

A : 0.33

B : 0.5

C : 0.75

D : 1.0

Q : 11) Strength of concrete increases with

A : Increase in water-cement ratio

B : Increase in fineness of cement

C : Decrease in curing time

D : Decrease in size of aggregate

Q : 12) The relation between modulus of rupture f_{cr} and characteristic strength of concrete f_{ck} is given by

A : $f_{ck} = 0.35 \sqrt{f_{ck}}$

B : $f_{ck} = 0.5 \sqrt{f_{ck}}$

C : $f_{cr} = 0.7 \sqrt{f_{ck}}$

D : $f_{cr} = 0.7 \sqrt{f_{ck}}$

Where f_{cr} and f_{ck} are in N/mm^2

Q : 13) The compressive strength of 100 mm cube as compared to 150 mm cube is always

A : Less

B : More

C : Equal

D : None of the above

Q : 14) According to IS : 456 -1978, the modulus of elasticity of concrete E_c (in N/mm^2) can be taken as

A : $E_c = 5700 \sqrt{f_{ck}}$

B : $E_c = 570 \sqrt{f_{ck}}$

C : $E_c = 5700 f_{ck}$

D : $E_c = 700 \sqrt{f_{ck}}$

Where f is the characteristic strength in N/mm^2

Q : 15) Increase in the moisture content in concrete

A : Reduces the strength

B : Increase the strength

C : Does not change the strength

D : All of the above

Q : 16) As compared to ordinary Portland cement, use of pozzolanic cement

A : Reduces workability

B : Increases bleeding

C : Increases shrinkage

D : Increases strength

Q : 17) Admixtures which cause early setting, and hardening of concrete are called

A : Workability admixtures

B : Accelerators

C : Retarders

D : Air entraining agents

Q : 18) The most commonly used admixture which prolongs the setting and hardening time is

A : Gypsum

B : Calcium chloride

C : Sodium silicate

D : All of the above

Q : 19) The percentage of voids in cement is approximately

A : 25 %

B : 40 %

C : 60 %

D : 80 %

Q : 20) The strength of concrete after one year as compared to 28 days strength is about

A : 10 to 15 % more

B : 15 to 20 % more

C : 20 to 25 % more

D : 25 to 50 % more

Q : 21) As compared to ordinary Portland cement. High alumina cement has

A : Higher initial setting time but lower final setting time

B : Lower initial setting time but higher final setting time

C : Higher initial and final setting times

D : Lower initial and final setting times

Q : 22) Modulus of rupture of concrete is a measure of

A : Flexural tensile strength

B : Direct tensile strength

C : Compressive strength

D : Split tensile strength

Q : 23) In order to obtain the best workability of concrete, the preferred shape of aggregate is

A : Rounded

B : Elongated

C : Angular

D : All of the above

Q : 24) The effect of adding calcium chloride in concrete is

- i. To increase shrinkage**
- ii. To decrease shrinkage**
- iii. To increase setting time**
- iv. To decrease setting time**

The correct answer is

A : (i) and (iii)

B : (i) and (iv)

C : (ii) and (iii)

D : (ii) and (iv)

Q : 25) Bulking of sand is maximum if moisture content is about

A : 2 %

B : 4 %

C : 6 %

D : 10 %

Q : 26) Finer grinding of cement

A : Effects only the early development of strength

B : Effects only the ultimate strength

C : Both (a) and (b)

D : Does not affects the strength

Q : 27) Poisson's ratio for concrete

A : Remains constant

B : Increases with richer mixes

C : Decrease with richer mixes

D : None of the above

Q : 28) 1 % of voids in a concrete mix would reduce its strength by about

A : 5 %

B : 10 %

C : 15 %

D : 20 %

Q : 29) The fineness modulus of fine aggregate is in the range of

A : 2 . 0 to 3 . 5

B : 3 . 5 to 5 . 0

C : 5 . 0 to 7 . 5

D : 6 . 0 to 8 . 5

Q : 30) The factor of safety for

A : Steel and concrete are same

B : Steel is lower than that for concrete

C : Steel is higher than that for concrete

D : None of the above

Q : 31) Examine the following statements :

- i. Factor of safety for steel should be based on its yield stress.**
- ii. Factor of safety for steel should be based on its ultimate stress.**
- iii. Factor of safety for concrete should be based on its yield stress.**
- iv. Factor of safety for concrete should be based on its ultimate stress.**

The correct answer is

- A : (i) and (iii)**
B : (i) and (iv)
C : (ii) and (iii)
D : (ii) and (iv)

Q : 32) For a reinforced concrete section, the shape of shear stress diagram is

A : Wholly parabolic

B : Wholly rectangular

C : Parabolic above neutral axis and rectangular below neutral axis

D : Rectangular above neutral axis and parabolic below neutral axis

Q : 33) Diagonal tension in a beam

A : Is maximum at neutral axis

B : Decreases below the neutral axis and increases above the neutral axis

C : Increases below the neutral axis and decreases above the neutral axis

D : Remains same

Q : 34) If a beam fails in bond, then its bond strength can be increased most economically by

A : Increasing the depth of beam

B : Using thinner bars but more in number

C : Using thicker bars but more in number

D : Providing vertical stirrups

Q : 35) If nominal shear stress // exceeds the design shear strength of concrete // the nominal shear reinforcement as per IS : 456-1978 shall be provided for carrying a shear stress equal to

A : τ_v

B : τ_c

C : $\tau_v - \tau_c$

D : $\tau_v + \tau_c$

Q : 36) If the depth of actual neutral axis in a beam is more than the depth of critical neutral axis, then the beam is called

A : Balanced beam

B : Under-reinforced beam

C : over-reinforced beam

D : None of the above

Q : 37) If the depth of neutral axis for a singly reinforced rectangular section is represented by k_d in working stress design, then the value of k for balanced section

A : Depends on σ_{st} only

B : Depends on σ_{cbc} only

C : Depends on both σ_{st} and σ_{cbc}

D : Is independent of both σ_{st} and σ_{cbc}

Where d is the effective depth, σ_{st} is permissible stress in steel in tension and σ_{cbc} is permissible stress in concrete in bending compression

Q : 38) If the permissible stress in steel in tension is 140 N/mm^2 then the depth of neutral axis for a singly reinforced rectangular balanced section will be

A : $0.35 d$

B : $0.40 d$

C : $0.45 d$

D : Dependent on grade of concrete also

Q : 39) Modulus of elasticity of steel as per IS : 456-1978 shall be taken as

A : 20 kN/cm²

B : 200 kN/cm²

C : 200 kN/mm²

D : 2 x 10⁶ kN/cm²

Q : 40) Minimum grade of concrete to be used in reinforced concrete as per IS : 456-1978 is

A : M 15

B : M 20

C : M 10

D : M 25

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M 20
iii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

Q : 41) For concreting of heavily reinforced sections without vibration, the workability of concrete expressed as compacting factor should be

A : 0.75 – 0.80

B : 0.80 – 0.85

C : 0.85 – 0.92

D : above – 0.92

<i>Placing Conditions</i>	<i>Degree of Workability</i>	<i>Slump (mm)</i>
(1)	(2)	(3)
Blinding concrete; Shallow sections; Pavements using pavers	Very low	See 7.1.1
Mass concrete; Lightly reinforced sections in slabs, beams, walls, columns; Floors; Hand placed pavements; Canal lining; Strip footings	Low	25-75
Heavily reinforced sections in slabs, beams, walls, columns;	Medium	50-100
Slipform work; Pumped concrete		75-100
Trench fill; <i>In-situ</i> piling	High	100-150
Tremie concrete	Very high	See 7.1.2

Q : 42) Maximum quantity of water needed per 50 kg of cement for M 15 grade of concrete is

A : 28 litres

B : 32 litres

C : 30 litres

D : 34 litres

Q : 43) In case of hand mixing of concrete, the extra cement to be added is

A : 5 %

B : 10 %

C : 15 %

D : 20 %

Q : 44) For walls, columns and vertical faces of all structure members, the form work is generally removed after.

A : 24 to 48 hours

B : 3 days

C : 7 days

D : 14 days

Q : 45) The individual variation between test strength of sample should not be more than

A : $\pm 5\%$ of average

B : $\pm 10\%$ of average

C : $\pm 15\%$ of average

D : $\pm 20\%$ of average

Q : 46) One of the criteria for the effective width of flange of T-beam is

In above formula, l_0 signifies

$$B_f = \frac{l_0}{6} + b_w + 6D_f$$

A : Effective span of zero moments limit is

B : Distance between points zero moment in the beam

C : Distance between points of maximum moment in the beam

D : Clear span of the t-beam

Q : 47) For a cantilever of effective depth of 0.5 m, the maximum span to satisfy vertical deflection limit is

A : 3.5 m

B : 4 m

C : 4.5 m

D : 5 m

Q : 48) For a simply supported beam of span 15 m, the maximum effective depth to satisfy the vertical deflection limits should be

A : 600 mm

B : 750 mm

C : 900 m

D : More than 1 m

Q : 49) For a continuous slab of 3 m x 3.5 m size, the minimum overall depth of slab to satisfy vertical limits is

A : 50 mm

B : 75 mm

C : 100 mm

D : 120 mm

Q : 50) According to IS :456-1978, the flexural strength of concrete is

A : Directly proportional to compressive strength

B : Inversely proportional to compressive strength

C : Directly proportional to square root of compressive strength

D : Inversely proportional to square root of compressive strength

Q : 51) According to IS : 456-1978, the column or the strut is the member whose effective length is greater than

A : The least lateral dimension

B : 2 times the least lateral dimension

C : 3 times the least lateral dimension

D : 4 times the least lateral dimension

Q : 52) According to IS : 456-1978, minimum slenderness ratio for a short column is

A : Less than 12

B : Less than 18

C : Between 18 and 24

D : More than 24

Q : 53) Lap length in compression shall not be less than

A : 15 ϕ

B : 20 ϕ

C : 24 ϕ

D : 30 ϕ

Q : 54) The minimum cover in a slab should neither be less than the diameter of bar nor less than

A : 10 mm

B : 15 mm

C : 25 mm

D : 13 mm

Q : 55) For a longitudinal reinforcing bar in a column, the minimum cover shall neither be less than the diameter of bar nor less than

A : 15 mm

B : 25 mm

C : 30 mm

D : 40 mm

Q : 56) The ratio of the diameter of reinforcing bars and the slab thickness is

A : 1 / 4

B : 1 / 5

C : 1 / 6

D : 1 / 8

Q : 57) According to IS : 456-1978, the maximum reinforcing in a column is

A : 2 %

B : 4 %

C : 6 %

D : 8 %

Q : 58) The percentage of reinforcement in case of slabs, when high strength deformed bars are used is not less than

A : 0.15

B : 0.12

C : 0.30

D : 1.00

Q : 59) Which of the following statements is incorrect ?

A : Minimum cross sectional area of longitudinal reinforcement in a column is 0.8 %

B : Spacing of longitudinal bars measured along the periphery of column should not exceed 300 mm.

C : Reinforcing bars in a column should not be less than 12 mm in diameter

D : The number of longitudinal bars provided in a circular column should not be less than four

Q : 60) Which of the following statements is incorrect ?

A : Higher vee-bee time shows lower workability.

B : Higher slump shows higher workability

C : Higher compacting factor factor shows higher workability.

D : None of the above

Q : 61) Minimum pitch of transverse reinforcement in a column is

A : The least lateral dimension of the member

B : Sixteen times the smallest diameter of longitudinal reinforcement bar to be tied

C : Forty-eight times the diameter of transverse reinforcement

D : Lesser of the above three values

Q : 62) Maximum distance between expansion joints in structures as per IS : 456-1978 is

A : 20 m

B : 30 m

C : 45 m

D : 60 m

Q : 63) A continuous beam is deemed to be a deep beam when the ratio of effective span to overall depth (l/D) is less than

A : 1.5

B : 2.0

C : 2.5

D : 3.0

Q : 64) Critical section for shear in case of flat slabs is at distance of

A : Effective depth of slab from periphery of column/drop panel

B : $d/2$ from periphery of column /capital/drop panel

C : At the drop panel of slab

D : At the periphery of column

Q : 65) Minimum thickness of load bearing RCC wall should be

A : 50 mm

B : 100 mm

C : 150 mm

D : 200 mm

Q : 66) If the storey height is equal to length of RCC wall, the percentage increase in strength is

A : 0

B : 10

C : 20

D : 30

Q : 67) In reinforced concrete footing in soil, the minimum thickness at edge should not be less than

A : 100 m

B : 150 m

C : 200 m

D : 250 m

Q : 68) The slab is designed as one way if the ratio of long span to short span is

A : Less than 1

B : Between 1 and 1.5

C : Between 1.5 and 2

D : Greater than 2

Q : 69) Ratio of permissible stress in direct compression and bending compression is

A : Less than 1

B : Between 1 and 1.5

C : Between 1.5 and 2.0

D : Greater than 2

Q : 70) A Higher modular ratio shows

A : Higher compression strength of concrete

B : Lower compressive strength of concrete

C : Higher tensile strength of steel

D : lower tensile strength of steel

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