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Q : 1) Consider the following statements: The design for the limit state of collapse in flexure is based on the following assumption:

- 1. Plane sections normal to the axis remain plane after bending.**
- 2. The maximum strain in concrete at the outermost tension fibre is 0.0035.**
- 3. The relationship between the compressive stress distribution in concrete and the strain in concrete may be assumed to be rectangular, trapezoidal, parabolic or any other shape which results in prediction of strength in substantial agreement with the results of tests.**

Select the correct answer using the codes given below:

A : 1 and 3

B : 1, 2 and 3

C : 2 and 3

D : 1 and 2

Q : 2) The probability of failure implied in limit state design is of the order of

A : 10^{-2}

B : 10^{-3}

C : 10^{-4}

D : 10^{-5}

**Q : 3) Consider the following statements:
Under-reinforced concrete flexural member**

- 1. Are deeper**
- 2. Are stiffer**
- 3. Can undergo larger deflection**

Which of these statements is/are correct?

A : 1, 2 and 3

B : 1 and 2

C : 2 only

D : 1 and 3

Q : 4) Which one of the following statements is correct?

The characteristic strength of concrete is

A : Higher than the average cube strength

B : Lower than the average cube strength

C : The same as the average cube strength

D : Higher than 90% of the average cube strength

Q : 5) Consider the following statements:

Cement concrete is a/an:

- 1. Elastic material**
- 2. Visco-elastic material.**
- 3. Visco-plastic material**

Which of the statements given above is/are correct?

A : 1, 2 and 3

B : 2 and 3

C : 2 only

D : 1 only

Q : 6) The final deflection due to all including effects of temperature, creep and shrinkage measured from as-cast level of the supports of floors, roofs and all other horizontal members of reinforced concrete should not normally exceed

A : $\text{Span}/350$

B : $\text{Span}/250$

C : $(\text{Span}/350)$ or 20 mm whichever is less

D : $(5/348)$ of span

Q : 7) Which one of the following is employed to determine strength of hardened existing concrete structure?

A : Bullet test

B : Kelley ball test

C : Rebound hammer test

D : Cone penetrometer

Q : 8) What is the minimum value of individual test results (in N/mm²) for compressive strength compliance requirement for concrete M20 as per codal provision?

A : $f_{ck} - 1$

B : $f_{ck} - 3$

C : $f_{ck} - 4$

D : $f_{ck} - 5$

Q : 9) Consider the following statements for minimum reinforcement to be provided in a wall as ratio of vertical reinforcement to gross concrete area:

- 1. 0.0012 for deformed bars.**
- 2. 0.0015 for all other types of bars.**
- 3. 0.0012 for welded wire fabric with wires not larger than 16 mm in diameter.**

Which of the above statements is/are correct?

A : 1, 2 and 3

B : 1 only

C : 2 and 3 only

D : 3 only

Q : 10) Consider modular ratio as 13, grade of concrete as M20 and grade of steel as 415, what is the ratio of balanced depth of neutral axis as per working stress method to the balanced depth of neutral axis as per limit state method?

A : 12/7

B : 11/3

C : 7/12

D : 3/11

Q : 11) Which of the following statements refer to correct purposes as regards testing of concrete by ultrasonic pulse velocity method?

- 1. To assess the quality of concrete in-situ.**
- 2. To determine the dynamic modulus of elasticity of concrete.**
- 3. To locate the presence of cracks in it.**

A : 1 and 2 only

B : 1 and 3 only

C : 2 and 3 only

D : 1, 2 and 3

**Q : 12) Consider the following statements:
Percentage of steel for balanced design of a
singly reinforced rectangular section by
limit state method depends on**

- 1. Characteristic strength of concrete.**
- 2. Yield strength of steel.**
- 3. Modulus of elasticity of steel.**
- 4. Geometry of the section.**

Which of these statements are correct?

A : 2, 3 and 4

B : 1, 3 and 4

C : 1, 2 and 4

D : 1, 2 and 3

Q : 13) The distance between the centroid of the area of tension reinforcement and the maximum compressive fibre in a reinforced concrete beam design is known as

A : Overall depth

B : Effective depth

C : Lever arm

D : Depth of neutral axis

Q : 14) As compared to the working stress method of design, the limit method of design premises that the concrete can admit

A : A lower stress level

B : A higher stress level

C : Occasionally higher, but usually lower, stress level

D : Only the same stress level

Q : 15) The permissible bending compressive strength for M 25 grade of concrete is 8.5 N/mm^2 . Its short-term and long-term modular ratios are nearly

A : 8 and 11

B : 8 and 8

C : 11 and 11

D : 11 and 6

Q : 16) Fatigue in RCC beams will not be a problem if the number of cycles is less than

A : 20,000

B : 25,000

C : 30,000

D : 35,000

Q : 17) Which of the following are correct for cover to reinforcement?

- 1. The reinforcement shall have a minimum clear cover of 20 mm or diameter of such bar whichever is more.**
- 2. At each end of reinforcing bar not less than 25 mm nor less than twice the diameter of such bar.**
- 3. Increased cover thickness may be provided when surface of concrete is exposed to the action of harmful chemicals.**

A : 1, 2 and 3

B : 1 and 2 only

C : 1 and 3 only

D : 2 and 3 only

Q : 18) As per IS 456 : 2000, cracking of concrete in tension zone cannot be avoided but can be limited by

- 1. Adhering to the codal requirements of minimum steel area**
- 2. Proper and prolonged curing of concrete**
- 3. Increasing water cement ratio to increase workability**

A : 1 and 2 only

B : 1 and 3 only

C : 2 and 3 only

D : 1, 2 and 3

Q : 19) The chances of diagonal tension cracks in R.C.C. member reduce when

A : Axial compression and shear force act simultaneously

B : Axial tension and shear force act simultaneously

C : Only shear force act

D : Flexural and shear force act simultaneously

Q : 20) Which one of the following statements is correct?

Minimum shear reinforcement is beams is provided in the form of stirrups

A : To resist extra shear force due to live load

B : To resist the effect of shrinkage of concrete

C : To resist principal tension

D : To resist shear cracks at the bottom of beam

Q : 21) Which one of the following statements is correct?

Diagonal tension reinforcement is provided in a beam as

A : Longitudinal bars

B : Bent up bars

C : Helical reinforcement

D : 90° bend at the bends of main bars

Q : 22) When is a masonry wall known as a shear wall?

A : If the earthquake load is out of plane

B : If the earthquake load is in plane

C : If it is unreinforced

D : If it is placed as infill to the frame

Q : 23) Shear strength of concrete in a reinforced concrete beam is a function of which of the following:

- 1. Compressive strength of concrete**
- 2. Percentage of shear reinforcement**
- 3. Percentage of longitudinal reinforcement in tension in the section**
- 4. Percentage total longitudinal reinforcement in the section**

Select the correct answer using the code given below:

A : 1, 2 and 4

B : 1, 2 and 3

C : Only 1 and 3

D : Only 1 and 4

Q : 24) What is the adoptable maximum spacing between vertical stirrups in an RCC beam of rectangular cross-section having an effective depth of 300 mm?

A : 300 mm

B : 275 mm

C : 250 mm

D : 225 mm

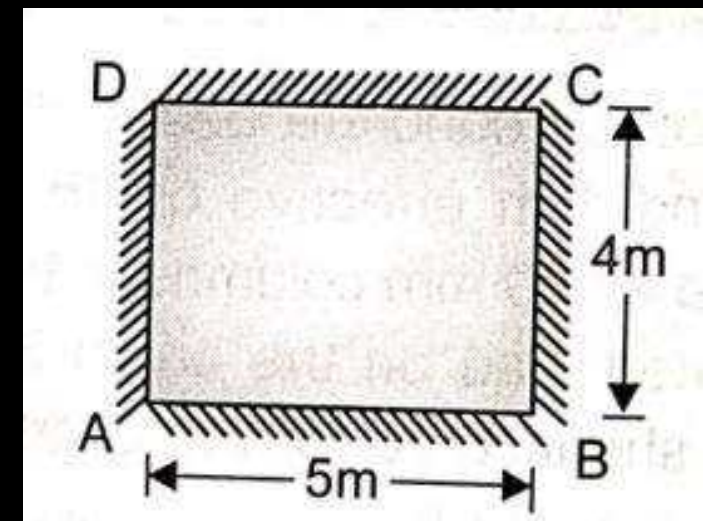
Q : 25) The RC slab, simply supported on all edges as in above figure, is subjected to a total UDL of 12 kN/m^2 . The maximum shear force/unit length along the edge 'BC' is

A : 16 kN

B : 12 kN

C : 8 kN

D : 30 kN



Q : 26) Assertion (A) : The specific surface of aggregates decreases with increase in size of the aggregates.

Reason (R) : The workability of mix is influenced more by finer fractions than the coarse particles.

Q : 27) If in a concrete mix the fineness modulus of coarse aggregate is 7.6, the fineness modulus of fine aggregate is 2.8 and the economical value of the fineness modulus of combined aggregate is 6.4, then the proportion of the fine aggregate is

A : 25%

B : $33\frac{1}{3}\%$

C : 50%

D : $66\frac{2}{3}\%$



Q : 28) General shrinkage in cement concrete is caused by

A : Carbonation

B : Stresses due to external load

C : Drying with starting with a stiff consistency

D : Drying with starting with a wetter consistency

Q : 29) Weigh-batching proceeds on

A : The assumption of the declared weight in each bag of cement

B : Weighing the contents of each bag

C : Accurately estimating the weight of each material to be used in each batch

D : The assumption of correct dry weight of each size range of each material and the weight of water

Q : 30) Reinforced concrete door and window frames can be compacted using

- 1. Needle vibrator**
- 2. Plate vibrator**
- 3. Form vibrator**
- 4. Tapping**

The correct sequence of these equipment in order of preference (from the best to the worst) is

A : 2, 3, 4, 1

B : 3, 2, 1, 4

C : 2, 3, 1, 4

D : 3, 2, 4, 1

Q : 31) Which of the following types of pumps can be used for concreting?

- 1. Piston operated**
- 2. Pneumatically operated**
- 3. Centrifugally operated, with straight blades.**
- 4. Screw type.**

A : 1 and 3

B : 1 and 2

C : 1, 3 and 4

D : 2 and 4

Q : 32) Consider the following statements:

Shrinkage of concrete depends upon the

- 1. Relative humidity of the atmosphere**
- 2. Passage of time**
- 3. Applied stress**

Which of these statements is/are correct?

A : 1 and 2

B : 1 and 3

C : 1 alone

D : 1, 2 and 3

Q : 33) Which one of the following statements is correct?

A : Bulking of sand always decreases with increase in the quantity of water

B : The quantity of water in ordinary concrete should be 5% by weight of cement and 25% by weight of aggregate

C : While mixing by weight, bulking effect of sand is not taken into account

D : River sand is also known as standard sand

Q : 34) Which one of the following types of concrete is most suitable in extreme cold climates?

A : Air-entrained concrete

B : Ready mix concrete

C : Vacuum concrete

D : Coarse concrete

Q : 35) Match List 1 (Workability test) with list II (Measurements) and select the correct answer:

List I	List II
A. Slump test	1. 300 mm to 500 mm
B. Compacting factor	2. 75 mm to 125 mm
C. Vee Bee test	3. 0.80 to 0.98
D. Flow test	4. Zero to 10 sec

Codes:

A : 2, 4, 3, 1

B : 1, 3, 4, 2

C : 1, 4, 3, 2

D : 2, 3, 4, 1

Q : 36) Which one of the following aggregate gives maximum strength in concrete?

A : Rounded aggregate

B : Elongated aggregate

C : Flaky aggregate

D : Cubical aggregate

Q : 37) Which of the following statements are the advantages of surface vibrators?

Surface vibrators are best suited

- 1. For one way reinforced slabs and road surfaces.**
- 2. When depth of the concrete to be vibrated exceeds 250 mm.**
- 3. Where immersion vibrations are impracticable.**

A : 1, 2 and 3

B : 1 and 2

C : 2 and 3

D : 1 and 3

Q : 38) Match List-I (Admixture) with List II (Action in concrete) and select the correct answer:

List-I	List-II
A. Calcium lignosulphonate	1. Anti bleeder
B. Aluminium powders	2. Retarder
C. Tartaric acid	3. Air entrainer
D. Aluminium sulphate	4. Water reducer

Codes:

A : 3, 2, 1, 4

B : 4, 3, 2, 1

C : 3, 4, 1, 2

D : 4, 2, 3, 1

Q : 39) Match List-I (material used in individual batching of concrete) with List-II (Tolerance when batch weight exceeds 30% of scale capacity) and select the correct answer:

List-I	List-II
A. Cement	1. $\pm 0.3\%$ of scale capacity
B. Water	2. $\pm 1\%$ of scale capacity
C. Aggregates	3. $\pm 2\%$ of scale capacity
D. Admixtures	4. $\pm 3\%$ of scale capacity

A : 1, 2, 3, 4

B : 1, 2, 4, 3

C : 3, 4, 1, 2

D : 4, 3, 1, 2

Q : 40) Slump and compaction factors are two different measures of workability of concrete. For a slump of 0 to 20 mm, what is the equivalent range of compaction factor?

A : 0.50 – 0.70

B : 0.70 – 0.80

C : 0.80 – 0.85

D : 0.85 – 0.92

Q : 41) The fineness modulus of fine aggregate is 2.78 and of coarse aggregate is 7.82 and the desired fineness modulus of mixed aggregate is 6.14.

What is the amount of fine aggregate to be mixed with one part of coarse aggregate

A : 55%

B : 50%

C : 45%

D : 40%

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