Civil Engineering objective questions

Concrete Technology

Design of Reinforced Concrete Structure

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Q 1 In reinforced concrete, pedestal is defined as compression member, whose effective length does not exceed its dimension by **[GATE-1999]**

(a) 12 times
(b) 3 times
(c) 16 times
(d) 8 times 1 (b)

Q 2 The minimum area of tension reinforcement in a beam shall be greater than

(a) 0.85bd/fy
(b) 0.87fy/bd
(c) 0.04bd
(d) 0.4bd/y 2. (b)

Q 3 The Characteristic strength of concrete is defined as that compressive strength below which not more than

(a) 10% of results fall
(b) 5% of results fall
(c) 2% of results fall
(d) none of the above 3.(b)

Q 4 Maximum strain at the level of compression steel for a rectangular section having effective cover to compression steel as d' and neutral axis depth from compression face as x_u is

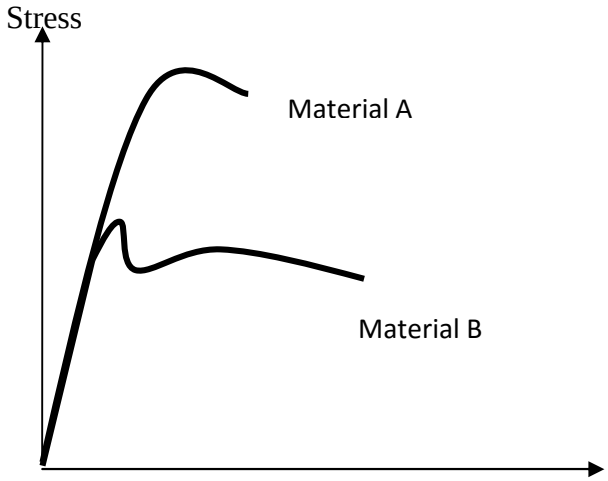
(a) $0.0035 \times (1-d'/ x_u)$
(b) $0.002 \times (1-d'/ x_u)$
(c) $0.0035 \times (1- x_u / d')$
(d) $0.002 \times (1- x_u / d')$ 4. (a)

Q 5 The following two statement are made with reference to a simply supported under reinforced RCC beam: **[GATE 2000]**

(I) Failure take place by crushing of concrete before the steel has yielded.
(II) The neutral axis moves up as the load is increased
With reference to the above statements, which of the following applies?

(a) Both the statements are false
(b) (b) I is true but II is false
(c) Both the statements are true
(d) I is false but II true 5. (d)

Q 6 The stress-strain diagram for two material A and B is shown below:



The following Statements are made based on this diagram:

(I) Material A is more brittle than material B.

(II) The ultimate strength of material B is more than that of A.

With reference to the above statements, which of the following applies?

(a) Both statements I and II TRUE

(b) Statement I is TRUE, and statement II is FALSE

(c) Statement I is False, and statement II is TRUE

(d) Both statements I and II FALSE (6) . a

Q 7 Considers the following two statements related to reinforced concrete design, and identify whether they are TRUE or FALSE. **[GATE 2001]**

I. Curtailment of bars in the flexural tension zone in beam reduces the shear strength at the cut-off locations.

II. When a rectangular column section is subjected to biaxially eccentric compression, the neutral axis will be parallel to the resultant axis of bending.

(a) Both statements I and II TRUE

(b) Statement I is TRUE, and statement II is FALSE

(c) Statement I is False, and statement II is TRUE

(d) Both statements I and II FALSE 7. (a)

Q 8 Read the following two statements **[GATE 2002]**

I. Maximum strain in concrete at the outermost compression fibre is taken to be 0.0035 in bending

II. The maximum compressive strain in concrete in axial compression is taken as 0.002

(a) Statement I is TRUE, and statement II is FALSE

(b) Statement I is False, and statement II is TRUE

(c) Both statements I and II TRUE

(d)) Both statements I and II FALSE 8. (c)

Q 9 As per the provisions of IS 456-2000, the (short term) modulus of elasticity of M25 grade concrete (in N/mm^2) can be assumed to be,

(a) 25000

(b) 28500

(c) 30000

d) 36000 9. (a)

Q 10 Partial safety factor for concrete and steel are 1.5 and 1.15 respectively, because

(a) concrete is heterogeneous while steel is homogeneous
(b) the control on the quality of concrete is not as good as that of steel
(c) concrete is week in tension
(d) voids in concrete are 0.5% while those in steel are 0.15% 10. (b)

Q 11 As compared to working stress method of design, limit state method take concrete to
(a) Higher stress level

(b) lower stress level

(c) same stress level

(d) sometimes higher but generally lower stress level 11. (a)

Q 12 For the purpose of design as per IS: 456, deflection of RC slab or beam is limited to

(a) 0.2% of span

(b) 0.25% of span

(c) 0.4% of span

(d) 0.45% of span 12. (a)

Q 13 (a) As per IS : 456, side face reinforcement, not less than 0.05% of web area, is provided on each side when the depth of web is not less than (IES-2000)

(a) 300mm

(b) 400 mm

(c) 500 mm

(d) 750 mm 13.(a)- (d)

Q13 (b) which one of the following pairs is correctly matched? (IES-2001)

(a) Truss- Bending

(b) Beam- Twisting

(c) Column- Buckling

(d) Shaft- Shortening 13. (c)

Q 14 For a reinforced concrete beam section the shape of the shear strain diagram is

(a) Parabolic over the whole section maximum value at the neutral axis

(b) Parabolic above the neutral axis and rectangular below the neutral axis

(c) linearly varying as the distance from the neutral axis

(d) dependent on the magnitude of shear reinforcement provided 14. (c)

Q 15 Consider the following statements:

The nominal maximum size of coarse aggregate should be as large as possible within the limits specified but in no case greater than

1. one-fourth of the minimum thickness of the member,
2. The diameter of bar

3. The spacing between bars

4. 25mm 15. (1)

Q 16 In an axially loaded spirally reinforced short column, the concrete inside the core is subjected to

(a) bending and compression

(b) biaxial compression

(c) triaxial compression

(d) uniaxial compression 16.(d)

Q 17 Consider the following statements:

The design for the limit state of collapse in flexure is based on the following assumptions:

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 the rectangular, trapezoidal or any other shape which results in prediction of strength in substantial agreement with the result of tests.

Select the correct answer using the code given below

(a) 1 and 3

(b) 1, 2 and 3

(c) 2 and 3

(d) 1 and 2 17. (a)

Q18 In case of deep beam or in thin webbed R.C.C. members, the first crack form is

(a) flexural crack

(2) diagonal crack due to compression

(3) diagonal crack due to tension

(4) shear crack 18. (3)

Q 19 The chances of diagonal tension cracks in R.C.C member reduces 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 19.(b)

Q 20 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} 20. (b)

Q 21 A symmetrical channel section is made of a material which is equally strong in tension and compression. It is used as a simply supported beam with its web horizontal to carry vertical loads. It will **[IES 2002]**

(a) be strongest if the web is used as top face
(b) be strongest if the web is used as bottom face

(c) be equally strong in (a) and (b) above
(d) not be possible to state which of the above statement is correct 21. (d)

Q 22 A free diagram of a body shows

(a) A body isolated from all external effects without considering its own weight

(b) A body isolated from its surroundings and all external forces acting on it

(c) A body isolated from its surroundings and all external action on it

(d) A body isolated from its surroundings and all internal forces acting on it 22. (b)

Q 23 Neglecting self weight, which of the following beams will have points of contraflexure?

(a) A simply supported beam with uniformly distributed load over part of the structure

(b) An overhanging beam with loading only over supported span and do not on overhangs

(c) Fixed beam subjected to concentrated load

(d) Cantilever beam subjected to uniformly varying load with zero load at free end 23.(c)

Q24 Resilience is

(a) maximum strain energy

(b) recoverable strain energy

(c) total potential energy

(d) shear strain energy (beyond hookes law) 24. (b)

Q 25 The reinforcement for tension, when required in member, shall consist of

(a) only longitudinal reinforcement in the tension face

(b) only longitudinal reinforcement in the compression face

(c) only two legged closed loops enclosing the corner reinforcement

(d) both longitudinal and transverse reinforcement 25. (d)

Q 26 The codal provisions recommend minimum shear reinforcement in the form of stirrups in the beam:

(a) to cater for any tension in the beam section

(b) to improve ductility of the cross section

(c) to improve dowel action of longitudinal tension bars

Select the correct answer using the codes given below

(a) 1,2 and 3 are correct

(b) 2 and 3 are correct

(c) only 1 is correct

(d) only 2 is correct 26. (d)

Q 27 Shrinkage in a concrete slab

(a) causes shear cracks

(b) causes tension cracks

(c) causes compression cracks

(d) does not cause any cracks 27. (b)

Q 28 Match list 1 and 2 and select the correct answer

List 1 (Type of cement)

(a) ordinary Portland cement

(b) Rapid hardening Cement

(c) Low heat cement

(d) Sulfate resistant cement

List 2 (characteristics)

(1) the percentage of C_3S is maximum and is of the order of 50%

(2) The % of C_2S and C_3S are the same and of the order of 40%

(3) reacts with silica during burning and causes particles to unite together and development of strength

(4) Preserves the form of brick at high temperature and prevent shrinkage

(Codes)

(a) A-2 ,B-4, C-1, D-3

(b) A-3 ,B-1, C-4, D-2

(c) A-2 ,B-1, C-4, D-3

(b) A-3 ,B-4, C-1, D-2 28. (c)

Q 29 Q 27 Match list 1 and 2 and select the correct answer

List 1 (Type of cement)

(a) High strength Portland cement (b) Super Sulfated cement (c) High alumina cement (d) Rapid hardening Portland Cement

List 2 (Property/characteristics)

1. Should not be used with any admixture

2. Is extremely resistant to chemical attack

3. Gives a higher rate of heat development during hydration of cement

4. Has a higher content of tricalcium silicate

Codes

(a) A-3 ,B-2, C-1, D-4

(b) A-4 ,B-1, C-2, D-3

(c) A-3 ,B-1, C-2, D-4

(b) A-4 ,B-2, C-1, D-3 29. (a)

Q 30 Four main oxides present in OPC(ordinary Portland Cement) are:Cao, Al203,Sio2 and Fe2o3.Identify the correct ascending order of their proportions in a typical; composition of OPC

(a) Al_2O_3, Fe_2O_3, Cao, SiO_2

(b) Al_2O_3, Cao, Fe_2O_3, SiO_2

(c) Fe_2O_3, Al_2O_3, SiO_2, Cao

(d) Fe_2O_3, Al_2O_3, SiO_2, Cao 30. (c)

Q31 Consider the following statements:

Pozzolana used as an admixture in concrete has the following advantages:

1. it improves workability with lesser amount of water.

2. it increases heat of hydration and so sets the concrete quickly.

3. it increases resistence to attack by salts and sulphates.

4. it leaches calcium hydroxide.

Select the correct answer using the codes given below:

(a) 1,2,3 and 4 (b) 1,2 and 4 (c) 1 and 3 (d) 2,3 and 4 31 (b)

Q 32 The length of time for which a concrete mixture will remain plastic is usually more dependent on **[IES 2003]**

(a) the setting time of cement than on the amount of mixing water and atmospheric temperature

(b) the atmospheric temperature than on the amount of mixing water and the setting time of cement

(c) the setting time of cement and amount of mixing water tan on atmospheric temperature

(d) the amount of mixing water used and atmospheric temperature than on the setting time of cement. 32. (d)

Q 33 At the location of the plastic hinge of a deformed structure

(a) Curvature is infinite

(b) Radius of curvature is infinite

(c) Moment is infinite

(d) Flexural stress is infinite 33. (b)

Q 34 The order of elongation which a specimen of mild steel undergoes before fracture is

(a) 0.1% (b) 1% (c) 10% (d) 100% 34. (c)

Q 35 in the context of the ultimate load theory for steel, the stress-strain curve for steel is idealized as

(a) A single straight line (b) Bi-linear (c) A quadratic Parabola (d) A circular arc 35.(b)

Q 36 Workability of concrete is directly proportional to

(a) aggregate cement ratio

(b) time to transit

(c) grading of the aggregate

(d) all of above 36. (a)

Q37 which of the following conditions are to be satisfied by an ideal plastic material?

1. it should follow hooke's law up to the limit of proportionality.

2. Strains up to the strain hardening in tension and compression are to be the same.

3. The material property should be different in tension and compression.

4. The values of yield stress in tension and compression should be different. 37. (2)

Q 38 For a compression member having the same effective length about any cross-sectional axis, the most preferred section from the point of view of strength is

(A box (b) An I-setion (c) A circular tube (d) A single angle 38.(a)

Q 39 A trapezoidal combined footing for two axially loaded coloumns is provided when

1. Width of the footing near the heavier column is restricted.

2. Length of the footing is restricted

3. Projections of the footing beyond the heavier column are restricted.

Select the correct answer using the codes given below:

(a) 1 and 2 (b) 1 and 3 (c) 2 and 3 (d) 1,2 and 3 39. (b)

Q 40 In case of two-way slab, the deflection of the slab is

(a) primarily a function of the long span

(b) primarily a function of the short pan

(c) independent of the span, long or short

(d) mostly long span but sometimes short span 40.(b)

Q 41 The critical section for two-way shear of footing is at the

(a) face of the column (b) distance d from the column face (c) distance d/2 from the column face
(d) distance 2d from the column face 41. (c)

Q 42 The proper size of mould for testing compressive strength of cement concrete is

(a) 7.05 cm cube
(b) 10.05 cm cube
(c) 15 cm cube
(d) 12.05 cm cube 42. (c)

Q 43 The specific gravity of commonly available OPC

(a) 4.92

(b) 3.15

(c) 2.05

(d) 1.83 43. (b)

Q 44 A quick setting cement has an initial setting time of about

(a) 50 minutes

(b) 40 minutes

(c) 15 minutes

(d) 5 minutes 44. (d)

Q 45 A mortar in which both cement and lime are used in definite proportions as binding materials is referred to as

(a) Light weight mortar

(b) fire resistant mortar

(c) gauged mortar

(d) water resistant mortar 45. (c)

Q 46 In order to improve the workability of harsh cement mortar which of the following items is/are added?

(1) Water (2) Plaster of paris (3) Lime

Select the correct answer using the codes given below:

(a) 1 only (b) 1 and 2 (c) 3 only (d) 1 and 3 46. (a)

Q 47 Match list 1 (Material Characteristics) with list 2 (property of concrete) and select the correct answer using the codes given below the lists:

List 1

(A) Water cement ratio (B) Water content (c) Minimum cement content (d) Segregation

List 2

(1) Durability (2) Compressive strength (3) Stability of mix (4) workability

(a) A-4, B-1, C-3, D-2 (b) A-2, B-4, C-3, D-1 (c) A-4, B-1, C-2, D-3 (d) A-2, B-4, C-1, D-3

47. (b)

Q 48 Stress-strain curve of concrete is

(a) a perfect straight line up to failure

(b) straight line upto 0.002% strain value and then parabolic up to failure

(c) Parabolic upto 0.002% strain value and then a straight line upto failure

(d) hyperbolic upto 0.002% strain value and then a straight line up to failure 48. (c)

Q 49 ultrasonic pulse velocity test is

1. used to measure the strength of wet concrete

2. used to obtain estimate of concrete strength of finished concrete elements.

3. a destructive test

4. a non-destructive test

(a)1,2 and 3 (b) 2 and 3 (c) 2 and 4 (d) 1 and 3 49. (c)

Q 50 The material in which large deformation is possible before the absolute failure or rupture is termed as

(a) brittle (b) Elastic (c) Ductile (d) Plastic 50. (c)

Q 51 As per the elastic theory of design the factor of safety is the ratio of

(a) working stress to stress at the limit of proportionality

(b) yield stress to working stress

(c) ultimate stress to working stress

(d) ultimate load to load at yield 51. (b)

Q 52 if the shear force diagram of simply supported beam is parabolic, then the load on the beam is

(a) uniformly distributed load

(b) concentrated load at mid span

(c) external moment acting at mid span

(d) Linearly varying distributed load 52. (d)

Q 53 The stresses in concrete in a reinforced concrete element under sustained load due to creep

(a) increase with time

(b) decrease with time

(c) remain unchanged

(d) fluctuate 53. (c)

Q 54 The economic spacing of a roof truss depends upon the **[IES-2000]**

(a) cost of purlins and cost of roof covering

(b) cost of roof covering and dead loads

(c) dead load and live load

(d) live loads and cost of purlins 54. (b)

Q 55 Bearing stiffeners are provided in a plate girder

1. to avoid local bending failure of flange

2. to prevent buckling of web

3. to strengthen the web

4. under uniformaly distributed loads 55. (1)

Q 56 Poision ratio for structural steel as per IS 800:2007

(1) 0.2 (2) 0.3 (3) 0.4 (4)0.5 56.(2)

Q 57 Modulus of rigidity for structural steel as per IS 800:2007

(1) 0.769 x 10^5 N/mm^2 (2) 0.769 x 10^6 N/mm^2 (3) 0.769 x 10^7 N/mm^2 (4) 0.769 x 10^8 N/mm^2 57. (1)

Q58 Co-efficient of thermal expansion for structural steel as per IS 800:2007

(1) 12 x10^{-6}/c (2) 12 x10^{-7}/c (3) 12 x10^{-8}/c (4) 12 x10^{-9}/c 58.(1)

Q 59 The total compressive force at the timeof failure of a concrete beam section of width 'b' without considering the partial safety factor of the material is **(Gate- 1991: 2 Marks)**

(1) 0.36 f_{ck} b X_u (2) 0.54 f_{ck} b X_u (3) 0.66 f_{ck} b X_u (4) 0.8 f_{ck} b X_u 59. (2)
Where X_u is the depth of neutral axis,
f_{ck} is cube strength of concrete

Q 60 A floor slab of thickness, t, is cast monolithically transverse to a rectangular continous beam of span, L, and width, B, if the distance between two consecutive points of contraflexure is, Lo, the effective width of compression flange at a continous support is **(Gate-1992:1 Marks)**

(a) B (b) L/3 (c) B+12t (d) B+6t+Lo/6 60.(d)

Q 61 A reinforced concrete member is subjected to combined action of compressive axial forces and bending moment. If εc is the least compressive strain in the member, fy, the yield strain of steel and Es, the modulus of elasticity of steel, the maximum permissible compressive strain in concrete member will be **(Gate-1992:1 Marks)**

(a) 0.002 (b) 0.002+fy/(1.15Es) (c) 0.0035-0.75 εc (d) 0.0035 61. (c)

Q 62 The factored loads at the limit state of collapse for DL+LL, DL+WL and DL+LL+WL combinations, according to IS: 456-1978 are respectively **(Gate-1993:1 marks)**
(a) 1.5DL+1.5LL, 1.2 DL+1.2WL, 1.5DL+1.5LL+1.5WL
(b) (0.9 or 1.5) DL+1.5 LL, 1.5 DL+1.5 WL, 1.2 DL+1.2 LL+1.2 WL
(c) 1.2 DL+1.2 LL, 1.5DL+1.5 WL, 1.5 DL+1.5 LL+1.5 WL
(d) 1.5 DL +1.5 LL, (0.9 or 1.5) DL + 1.5 WL, 1.2 DL+1.2 LL+1.2 WL 62. (d)

Q 63 The basic assumption of plane sections normal to the neutral axis before bending remaining plane and normal to the neutral axis after bending, leads to **(Gate-1995:1 marks)**

(a) Uniform strain over the beam cross-section
(b) Uniform stress over the beam cross section
(c) Linearly varying strain over the cross section
(d) stresses which are proportional to strains at the cross section 63. (c)

Q 64 the span to depth ratio limit is specified in IS : 456- 1978 for the reinforced concrete beams, in order to ensure that the **(Gate-1995:1 marks)**

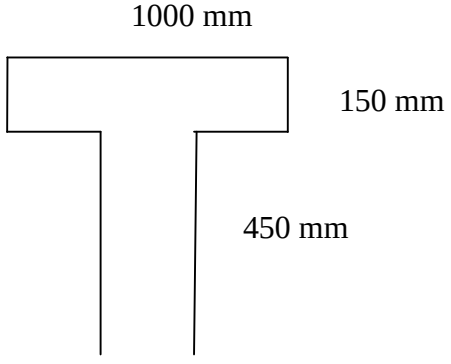
(a) tensile crack width is below a limit
(b) shear failure is avoided
(c) stress in the tension reinforcement is less than the allowable value
(d) deflection of the beam is below a limiting value 64. (d)

Q 65 The modulus of rupture of concrete gives **(Gate-1995:1 marks)**
(a) the direct tensile strength of the concrete
(b) the direct compressive strtength of the concrete
(C) the tensile strength of the concrete under bending
(d) the characteristics strength of the concrete 65. (c)

Q 66 the effective width of a reinforced concrete T-beam flange under compression, according to IS 456-1978, given Io is the distance between the adjacent zero moments points, b is the breadth of the rib and D is the thickness of the flange, is **(Gate-1995:1 marks)**
(a) (lo/6) + B +6D
(b) lo+6 D
(c) (lo/6) +6D
(d) (lo/6) + B 66. (a)

Q 67 the cylindrical strength of the concrete is less than the cube strength because of **(Gate-1997: 1 marks)**
(a) the difference in the shape of the cross section of the specimens
(b) the difference in the slenderness ratio of the specimens
(c) the friction between the concrete specimen and the steel plate of the testing machine
(d) the cubes are tested without capping but the cylinder are tested with capping 67. (b)

Q 68 An isolated T beam is used as a walkway. The beam is simply supported with an effective span of 6m. the effective width of flange, for the cross section shown in figure is **(1998:1 mark)**



300 mm

(a) 900 mm (b) 1000 mm (c) 1259 mm (d) 2200 mm 68. (a)

Q 69 The characteristic strength of concrete is defined as that compressive strength below which not more than **(1999: 1 mark)**

(a) 10% of result fail
(b) 4% of result fail
(c) 2% of result fail
(d) none of the above 69. (d)

Q 70 Maximum strain at the level of the compression steel for a rectangulat section having effective cover to compression steel as 'd' and neutral axis depth from compression face X_u is **(1999: 1 mark)**

(a) $0.0035 (1-d'/X_u)$
(b) $0.002 (1-d'/X_u)$
(c) $0.0035 (1- X_u / d')$
(d) $0.002 (1- X_u / d')$ 70. (a)

Q 71 The following two statements are made with reference to a simply supported under reinforced RCC beam **(2000: 1 mark)**

(1) Failure takes place by crushing of concrete before the steel has yielded.
(2) The neutral axis moves up as the load is increased

With reference to the above statements
Which of the following applies?
(a) Both the statements are false
(b) I is tue but II is false
(C) Both the statements are true
(d) I is false but II is true 71. (d)

Q 72 As per the provisions of IS 456-2000 the (short term) modulus of elasticity of M 25 grade concrete (in N/mm^2) can be assumed to be **(2002: 1 mark)**

(a) 25000
(b) 28500
(c) 30000
(d) 36000 72. (a)

Q 73 In which one of the following, the point of contraflexure will not occur [IES-2004]

1. A two span continuous beam of equal spans, simply supported and loaded by UDL over both spans

2. A simply supported beam loaded by UDL

3. A fixed beam loaded by UDL

4. A propped cantilever loaded by UDL 73. (2)

Q 74 For quality control of Portland cement, the test essentially done is

1. setting time

2. soundness

3. tensile strength

4. consistency

5. all the above. 74. (5)

Q 75 If 1500 g of water is required to have a cement paste 1875 g of normal consistency, the percentage of water is,

1. 20%

2. 25%

3. 30%

4.35% 75. (2)

Q 76 Under normal conditions using an ordinary cement, the period of removal of the form work, is

1. 7 days for beam soffits

2. 14 days for bottom slabs of spans 4.6 m and more

3. 21 days for bottom beams over 6 m spans

4. 2 days for vertical sides of columns

5. all the above. 76. (5)

Q 77 For given water content, workability decreases if the concrete aggregates contain an excess of

1. thin particles
2. flat particles
3. elongated particles
4. flaky paticles
5. all the above. 77. (5)

Q 78 M10 grade of concrete approximates

1. 1 : 3 : 6 mix
2. 1 : 1 : 2 mix
3. 1 : 2 : 4 mix
4. none of these. 78.(1)

Q 79 For ensuring quality of concrete, use

1. single sized aggregates
2. two sized aggregate
3. graded aggregates
4. coarse aggregates. 79. (3)

Q 80 The mixture of different ingredients of cement, is burnt at

1. 1000°C
2. 1200°C
3. 1400°C
4. 1600°C 80. (3)

Q 81 (a) The risk of segregation is more for

1. wetter mix
2. larger proportion of maximum size aggregate
3. coarser grading
4. all the above. 81(a)- (4)

Q 81 (b) After casting, an ordinary cement concrete on drying

1. Expands
2. mix
3. shrinks
4. none of these. 81 (b)- (3)

Q 82 Hydration of cement is due to chemical action of water with

1. Tricalcium silicate and dicalcium silicate

2. Dicalcium silicate and tricalcium aluminate

3. Tricalcium aluminate and tricalcium alumino ferrite

4. All the above. 82. (4)

Q 83 To obtain cement dry powder, lime stones and shales or their slurry, is burnt in a rotary kiln at a temperature between

1. 1100° and 1200°C
2. 1200° and 1300°C
3. 1300° and 1400°C
4. 1400° and 1500°C 83. (2)

Q 84 Permissible compressive strength of M 300 concrete grade is

1. 100 kg/cm^2

2.150 kg/cm^2

3.200 kg/cm^2

4.300 kg/cm^2 84. (1)

Q 85 The standard sand now a days used in India, is obtained from

1. Jaipur (Rajasthan)
2. Jullundur (Punjab)
3. Hyderabad (Andhra Pradesh)
4. Ennore (Madras) 85.(4)

Q 86 The maximum amount of dust which may be permitted in aggregates is

1. 5% of the total aggregates for low workability with a coarse grading
2. 10% of the total aggregates for low workability with a fine grading
3. 20% of the total aggregates for a mix having high workability with fine grading
4. all the above. 86.(4)

Q 87 Proper proportioning of concrete, ensures

1. desired strength and workability
2. desired durability
3. water tightness of the structure
4. resistance to water
5. all the above. 87. (5)

Q 88 The bulk density of aggregates does not depend upon :

1. size and shape of aggregates
2. specific gravity of aggregates
3. grading of aggregates
4. size and shape of the container 88.(4)

Q 89 Curing

1. reduces the shrinkage of concrete
2. preserves the properties of concrete
3. prevents the loss of water by evaporation
4. all of the above. 89.(4)

Q 90 While compacting the concrete by a mechanical vibrator, the slump should not exceed

1. 2.5 cm

2. 5.0 cm

3. 7.5 cm

4. 10 cm 90. (1)

Q 91 An aggregate is said to be flaky if its least dimension is less than

1/5th of mean dimension

2/5th of mean dimension

3/5th of mean dimension

4/5th of mean dimension 91. (c)

Q 92 The following proportion of the ingredients of concrete mix, is not in conformation to arbitrary method of proportioning

(1) 1 : 1 : 2

(2) 1 : 2 : 4

(3) 1 : 3 : 6

(4) 1 : 4 : 10 92. (1)

Q 93 The increased cohesiveness of concrete, makes it

1. less liable to segregation
2. more liable to segregation

3. more liable to bleeding
4. more liable for surface scaling in frosty weather 93. (1)

Q 94 To ensure constant moisture content in aggregates

1. area of each aggregate pile should be large
2. height of each aggregate pile should not exceed 1.50 m
3. aggregate pile should be left for 24 hours before aggregates are used
4. all the above. 94.(4)

Q 95 Workability improved by adding

1. air-entraining agent
2. foaming agent
3. oily-agent
4. aluminium compound
5. all the above. 95.(5)

Q 96 The commonly used material in the manufacture of cement is

1. sand stone
2. slate
3. lime stone
4. Graphite 96.(3)

Q 97 If 20 kg of coarse aggregate is sieved through 80 mm, 40 mm, 20 mm, 10 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron and 150 micron standard sieves and the weights retained are 0 kg, 2 kg, 8 kg, 6 kg, 4 kg respectively, the fineness modulus of the aggregate, is

1. 7.30

2. 7.35

3. 7.40

4. 7.45 97. (2)

Q 98 Curing a concrete for long period ensures better

1. volume stability
2. strength
3. water resistance
4. water tightness and durability
5. all the above. 98. (5)

Q 99 For the construction of cement concrete floor, the maximum permissible size of aggregate, is

1. 4 mm
2. 6 mm
3. 8 mm
4. 10 mm 99. (4)

Q 100 The process of proper and accurate measurement of concrete ingredients for uniformity of proportion, is known

1. Grading
2. Curing
3. Mixing
4. Batching 100.(4)

Q 101 Pick up the correct statement from the following:

1. Insufficient quantity of water makes the concrete mix harsh
2. Insufficient quantity of water makes the concrete unworkable
3. Excess quantity of water causes bleeding in concrete
4. All the above. 101. (4)

Q 102 Pick up the correct proportions of chemical ingredients of cement

1. Lime : Silica : Alumina : Iron oxide : 63 : 22 : 6 : 3
2. Silica : Lime : Alumina : Iron oxide : 63 : 22 : 6 : 3
3. Alumina : Silica : Lime : Iron oxide : 63 : 22 : 6 : 3
4. Iron oxide : Alumina : Silica : Lime : 63 : 22 : 6 : 3 102. (1)

Q 103 Transport of concrete by pumps, is done for a distance of

1. 100 m
2. 200 m
3. 300 m
4. 400 m 103. (4)

Q 104 If *X*, *Y* and *Z* are the fineness modulli of coarse, fine and combined aggregates, the percentage (*P*) of fine aggregates to combined aggregates, is

$$P = \frac{Z - X}{Z - y} \times 100$$

$$P = \frac{X - Z}{Z - Y} \times 100$$

$$P = \frac{X - Z}{Z + y} \times 100$$

$$P = \frac{X + Z}{Z - y} \times 100$$

$$P = \frac{Z - X}{Y - Z} \times 100$$

104. (b)

Q 105 Slump test is done for

1. Clay
2. sand
3. lime
4. concrete 105 (4)

Q 106 The high strength of rapid hardening cement at early stage, is due to its

1. finer grinding
2. burning at high temperature
3. increased lime cement
4. higher content of tricalcium 106. (c)

Q 107 Pick up the correct statement from the following:

1. The weight of ingredients of concrete mix, is taken in kilograms
2. 20 bags of cement make one tone
3. The finished concrete is measured in cubic metres
4. All the above 107. (4)

Q 108 Concrete mainly consists of

1. Cement
2. aggregates
3. admixture
4. water
5. all the above 108. (5)

Q 109 Vicat's apparatus is used for

1. fineness test
2. consistency test
3. setting time test
4. soundness test 109 (b)

Q 110 M 15 grade of concrete approximates

1. 1 : 3 : 6 mix
2. 1 : 1 :2 mix
3. 1 : 2 : 4 mix
4. 1 : 1.5 : 3 mix 110. (c)

Q 111 Workability of concrete is measured by

1. Vicat apparatus test
2. Slump test
3. Minimum void method
4. Talbot Richard test 111. (2)

Q112 The rock which is not calcareous, is:

1. lime stone
2. macl
3. chalk
4. laterite 112. (4)

Q 113 Internal friction between the ingredients of concrete, is decreased by using

1. less water
2. fine aggregates
3. rich mix
4. more water and coarse aggregates 113. (4)

Q 114 For road pavements, the cement generally used, is

1. ordinary Portland cement
2. rapid hardening cement
3. low heat cement
4. blast furnace slag cement 114. (2)

Q 115 Construction joints are generally provided in concrete

1. Roads
2. retaining walls
3. lining of canals
4. all the above. 115. (4)

Q 116 According to the recommendations of IS : 456-1978, the expansion joints

1. are provided where plane changes abruptly
2. are provided to ensure minimum resistance
3. do not carry reinforcement across them
4. all the above 116. (4)

Q 117 Grading of sand causes great variation in

1. workability of concrete
2. strength of concrete
3. durability of concrete
4. all the above 117. (4)

Q 118 Shrinkage in concrete can be reduced by using

1. low water cement ratio
2. less cement in the concrete
3. proper concrete mix
4. all the above 118. (4)

Q 119 Ordinary concrete is not used for concrete grade

1. M 10
2. M 15
3. M 20
4. M 25
5. M 40 119. (5)

Q 120 1.S. Sieve Nos. 10 mm and 4.75 mm are geneally used for grading of

1. coarse aggregates
2. fine aggregates
3. neither (a) nor (b)
4. both (a) and (b) 120. (4)

Q 121 Pick up the correct statement from the following:

1. The free water is the amount of water added while mixing and the amount of water held on the surface of the aggregates prior to mixing
2. The total water is the free water and the amount actually absorbed by the aggregates
3. Neither (a) nor (b)
4. Both (a) and (b).

Q122 Addition of pozzolana to ordinary port land cement, causes

1. decrease in early strength
2. reduction in chemical action with sulphates
3. increase in shrinkage
4. reduction bleeding
5. all the above 122. (5)

Q 123 Addition of pozzolana to cement causes

1. reduction in permeability
2. loss of heat of hydration
3. reduction in bleeding
4. increase in curing time
5. all the above 123. (5)

Q 124 Hardening of cement occurs at

1. rapid rate during the first few days and afterwards it continues to increase at a decreased rate
2. slow rate during the first few days and afterwards it continues to increase at a rapid rate
3. uniform rate throughout its age
4. none of these. 124. (4)

Q 125 Pick up the correct statement from the following:

1. Lime in excess, causes the cement to expand and disintegrate
2. Silica in excess, causes the cement to set slowly
3. Alumina in excess, reduces the strength of the cement
4. Magnesium oxide in excess, remains in free state and makes the cement unsound
5. All the above 125. (5)

Q126 Pick up the correct statement from the following.

1. Higher workability indicates unexpected increase in the moisture content
2. Higher workability indicates deficiency of sand
3. If the concrete mix is dry, the slump is zero
4. Concrete mix having zero slump, is unsuitable for high strength
5. All the above 126. (5)

Q 127 You are asked to construct a massive dam, the type of cement you will use, is

1. ordinary Portland cement
2. rapid hardening cement
3. low heat cement
4. blast furnace slag cement 127. (3)

Q128 Water required per bag of cement, is

1. 7 kg
2. 14 kg
3. 21 kg
4. 35 kg 128. (4)

Q 129 C.R.R.I. charts are used to obtain a relatioship between strength of concrete and

1. water cement ratio
2. workability
3. grading of aggregate
4. fineness modulus 129. (1)

Q 130 For compacting plain concrete road surface of thickness less than 20 cm, we use

1. internal vibrator
2. screed vibrator
3. form vibrator
4. none of these 130. (2)

Q 131 As per I.S. 456 - 1978, the pH value of water shall be

1. less than 6
2. equal to 6
3. not less than 6
4. equal to 7 131.(3)

Q 132 The minimum number of main steel bars provided in R.C.C.

1. rectangular columns is 4
2. circular columns is 6
3. octagonal columns is 8
4. all the above 132.(4)

Q 133 Post tensioning system

1. was widely used in earlier days
2. is not economical and hence not generally used
3. is economical for large spans and is adopted now a days
4. none of these 133. (4)

Q 134 The width of the flange of a T-beam should be less than

1. one-third of the effective span of the T-beam
2. distance between the centres of T-beam
3. breadth of the rib plus twelve times the thickness of the slab
4. least of the above 134. (4)

Q 135 A prestressed rectangular beam which carries two concentrated loads W at $L/3$ from either end, is provided with a bent tendon with tension P such that central one-third portion of the tendon remains parallel to the longitudinal axis, the maximum dip h is

$\frac{WL}{P}$

$\frac{WL}{2P}$

$\frac{WL}{3P}$

$\frac{WL}{4P}$ 135. (c)

Q 136 Pick up the correct statement from the following:

1. A pile is a slender member which transfers the load through its lower end on a strong strata
2. A pile is a slender member which transfers its load to the surrounding soil
3. A pile is a slender member which transfers its load by friction
4. A pile is a cylindrical body of concrete which transfers the load at a depth greater than its width 136. (2)

Q 137 Cantilever retaining walls can safely be used for a height not more than

1. 3 m
2. 4 m
3. 5 m
4. 6 m 137. (4)

Q 138 If *W* is the load on a circular slab of radius *R*, the maximum circumferential moment at the centre of the slab, is

$\frac{WR^2}{16}$

$\frac{2WR^2}{16}$

C $\frac{3WR^2}{16}$

Zero 138. (c)

Q 139 If a bent tendon is required to balance a concentrated load *W* at the centre of the span *L*, the central dip h must be at least

$\frac{WL}{P}$

$\frac{WL}{2P}$

$\frac{WL}{3P}$

$\frac{WL}{4P}$ 139. (d)

Q 140 For M 15 mix concrete, according to I.S. specifications, local bond stress, is

1. 5 kg/cm^2
2. 10 kg/cm^2
3. 15 kg/cm^2
4. 20 kg/cm^2 140. (3)

Q 141 The diameter of longitudinal bars of a column should never be less than

1. 6 mm
2. 8 mm
3. 10 mm
4. 12 mm 141. (4)

Q142 The design of a retaining wall assumes that the retained earth

1. is dry
2. is free from moisture
3. is not cohesive
4. all the above 142. (4)

Q143 For a circular slab carrying a uniformly distributed load, the ratio of the maximum negative to maximum positive radial moment, is

1. 2

2. 4

3. 6

4. none of the above 143. (1)

Q 144 Thickened part of a flat slab over its supporting column, is technically known as

1. drop panel
2. capital

3. column head
4. none of these 144. (1)

Q 145 An R.C.C. beam not provided with shear reinforcement may develop cracks in its bottom inclined roughly to the horizontal a

1. 25°
2. 35°
3. 45°
4. 55° 145. (3)

Q 146 The effective span of a simply supported slab, is

1. distance between the centres of the bearings
2. clear distance between the inner faces of the walls plus twice the thickness of the wall
3. clear span plus effective depth of the slab
4. none of these 146. (2)

Q 147 Pick up the incorrect statement from the following:

1. In the stem of a retaining wall, reinforcement is provided near the earth side
2. In the toe slab of a retaining wall, rein forcement is provided at the bottom of the slab
3. In the heel slab of a retaining wall, reinforcement is provided at the top of the slab
4. None of these 147. (4)

Q 148 The minimum cube strength of concrete used for a prestressed member, is

1. 50 kg/cm^2
2. 250 kg/cm^2
3. 350 kg/cm^2
4. 400 kg/cm^2 148. (4)

Q 149 The number of treads in a flight is equal to

1. risers in the flight
2. risers plus one
3. risers minus one
4. none of these. 149. (3)

Q 150 A short column 20 cm x 20 cm in section is reinforced with 4 bars whose area of cross section is 20 sq. cm. If permissible compressive stresses in concrete and steel are 40 kg/cm^2 and 300 kg/cm^2, the Safe load on the column, should not exceed

1. 4120 kg
2. 41, 200 kg
3. 412, 000 kg

4. none of these 150. (2)

Q 151 In a beam the local bond stress S_b, is equal to

$$\frac{\text{Shear force}}{\text{Lever arm x Total perimeter of reinforcement}}$$

$$\frac{\text{Total perimeter of reinforcement}}{\text{Lever arm x Shear force}}$$

$$\frac{\text{Lever arm}}{\text{Shear force x Total perimeter of reinforcement}}$$

$$\frac{\text{Lever arm}}{\text{Bending moment x Total perimeter}}$$

151. (a)

Q 152 A foundation rests on

1. base of the foundation

2. subgrade

3. foundation soil

4. both (b) and (c) 152. (4)

Q 153 For initial estimate for a beam design, the width is assumed

1. 1/15th of span
2. 1/20th of span
3. 1/25th of span
4. 1/30th of span 153. (4)

Q 154 The advantage of a concrete pile over a timber pile, is

1. no decay due to termites
2. no restriction on length
3. higher bearing capacity
4. not necessary to cut below the water mark
5. all the above 154.(5)

Q 155 Design of a two way slab simply supported on edges and having no provision to prevent the corners from lifting, is made by

1. Rankine formula
2. Marcus formula
3. Rankine Grashoff formula
4. Grashoff formula 155. (3)

Q 156 Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at

1. Supports
2. mid span
3. every section
4. quarter span 156.(2)

Q 157 The transverse reinforcements provided at right angles to the main reinforcement

1. distribute the load
2. resist the temperature stresses
3. resist the shrinkage stress
4. all the above 157. (4)

Q 158 The amount of reinformcement for main bars in a slab, is based upon

1. minimum bending moment
2. maximum bending moment
3. maximum shear force
4. minimum shear force 158. (2)

Q 159 If the effective length of a 32 cm diameter R.C.C. column is 4.40 m, its slenderness ratio, is

1. 40
2. 45
3. 55
4. 60 159. (4)

Q 160 The percentage of minimum reinforcement of the gross sectional area in slabs, is

1. 10%

2. 15%

3. 20%

4. 25% 160. (2)

Q 161 A continuous beam shall be deemed to be a deep beam if the ratio of effective span to overall depth, is

1. 2.0

2. 2.5

3. Less than 2

4. Less than 3 161. (2)

Q 162 The effective width of a column strip of a flat slab, is

1. one-fourth the width of the panel
2. half the width of the panel
3. radius of the column
4. diameter of the column 162. (2)

Q 163 High strength concrete is used in prestressed member

1. to overcome high bearing stresses developed at the ends
2. to ovecome bursting stresses at the ends
3. to provide high bond stresses
4. to overcome cracks due to shrinkage
5. all the above 163. (5)

Q 164 A T-beam behaves as a rectangular beam of a width equal to its flange if its neutral axis

1. remains within the flange
2. remains below the slab
3. coincides the geometrical centre of the beam
4. none of these 164. (1)

Q 165 The weight of a foundation is assumed as

1. 5% of wall weight
2. 7% of wall weight
3. 10% of wall weight
4. 12% of wall weight 165. (3)

Q 166 The live load to be considered for an inaccessible roof, is

1. Nil
2. 75 kg/m^2
3. 150 kg/cm^2
4. 200 kg/m^2 166. (2)

Q 167 The radius of a bar bend to form a hook, should not be less than

1. twice the diameter
2. thrice the diameter
3. four times the diameter
4. five times the diameter 167. (1)

Q 168 In a simply supported slab the minimum spacing of distribution reinforcement, should be four times the effective thickness of the slab or

1. 20 cm
2. 30 cm
3. 40 cm
4. 60 cm 168. (4)

Q 169 If the ratio of the span to the overall depth does not exceed 10, the stiffness of the beam will ordinarily be satisfactory in case of a

1. simply supported beam
2. continuous beam
3. cantilever beam
4. none of these 169. (3)

170 The toe projection of foundation slabs is taken

1. as one third of the base
2. as one sixth of overall height of the wall
3. equal to heel slab
4. below ground surface 170. (1)

Q 171 Steel beam theory is used for

1. design of simple steel beams
2. steel beams encased in concrete
3. doubly reinforced beams ignoring compressive stress in concrete
4. beams if shear exceeds 4 times allowable shear stress 171. (3)

Q 172 The shear reinforcement in R.C.C. is provided to resist

1. vertical shear
2. horizontal shear
3. diagonal compression
4. diagonal tension 172. (4)

Q 173 A pile of length *L* carrying a uniformly distributed load *W* per metre length is suspended at two points, the maximum, B.M. at the centre of the pile or at the points of suspension, is

$\frac{WL}{8}$

$\frac{WL^2}{24}$

$\frac{WL^2}{47}$

$\frac{WL^2}{26}$ 173. (c)

Q 174 The horizontal portion of a step in a stairs case, is known as

1. Rise
2. Flight
3. Winder
4. Tread 174. (4)

Q 175 Distribution reinforcement in a simply supported slab, is provided to distribute

1. Load
2. temperature stress
3. shrinkage stress
4. all the above 175. (4)

Q 176 To ensure that the hogging bending moment at two points of suspension of a pile of length *L* equals the sagging moment at its centre, the distances of the points of suspension from either end, is

1. 0.107 *L*

2. 0.207 *L*

3. 0.307 *L*

4. 0.407 *L* *176. (2)*

Q 177 To ensure uniform pressure distribution, the thickness of the foundation, is

1. kept uniform throughout
2. increased gradually towards the edge
3. decreased gradually towards the edge
4. kept zero at the edge 177. (3)

Q 178 The maximum ratio of span to depth of a cantilever slab, is

1. 8
2. 10
3. 12
4. 14 178. (3)

Q 179 Pick up the incorrect statement from the following. The intensity of horizontal shear stress at the elemental part of a beam section, is directly proportional to

1. shear force
2. area of the section
3. distance of the C.G. of the area from its neutral axis
4. moment of the beam section about its neutral axis
5. width of the beam 179. (4)

Q 180 In a singly reinforced beam, the effective depth is measured from its compression edge to

1. tensile edge
2. tensile reinforcement
3. neutral axis of the beam
4. longitudinal central axis 180. (2)

Q 181. The presence of dicalcium silicate in cement.
(a) Hydrates the cement slowly.
(b) Generates less heat of hydration.
(c) Has more resistance to sulphate attack
(d) All of these 181. (d)

Q 182. High percentage of tricalcium silicate and low percentage of dicalcium silicate in cement results
in.
(a) Rapid hardening
(b) High early strength
(c) High heat of generation
(d) All the above 182. (d)

Q183. The first compound which reacts with water when mixed with cement is
(a) Tricalcium Aluminate
(b) Tricalcium silicate
(c) Di-calcium silicate
(d) Teracalcium aluminate 183. (a)

Q184. The sum of the percentage of tricalcium silicate and dicalcium silicate for Portland cement varies
from.
(a) 50 to 60%
(b) 60 to 70%

(c) 70 to 80%
(d) 80 to 90% 184. (c)

Q 185 The rate of hydration is _____proportional to the generation of heat
(a) Directly
(b) Indirectly
(c) Equally
(d) None of these 185. (a)

Q186. Rapid hardening cement is used
(a) Where high early strength is desired
(b) Where form work is to be removed as early as possible
(c) For construction of road pavements.
(d) All of the above 186. (d)

Q187. Low heat cement is used in
(a) Thin structures
(b) Thick structures
(c) Sea structures
(d) Submarine structures 187. (b)

Q188. Blast furnace slag cement concrete requires _____time for shuttering and curing.
(a) Less
(b) More
(c) Medium
(d) All the above 188. (b)

Q189. Which of the following cements is expected to have the highest compressive strength after 3
days
(a) Ordinary Portland cement
(b) Rapid hardening cement
(c) High alumina cement
(d) Sulphate resisting cement. 189. (c)

Q 190. Under sea structure, the cement used is
(a) R.H.C
(b) L.H.C
(c) H.A.C
(d) RSC 190. (c)

Q191. The cement, widely used in retaining walls, is
(a) R.H.C
(b) L.H.C
(c) S.R.C

(d) O.P.C 191. (b)

Q192. The strength of concrete using air entraining cement gets reduced by
(a) 5 to 10%
(b) 10 to 15%
(c) 15 to 20%
(d) 20 to 25% 192. (b)

Q193. Pozzolana is essentially a silicious material containing clay up to
(a) 20%
(b) 40%
(c) 60%
(d) 80% 193. (d)

Q194. Which of the following statements is correct?
(a) Sulphate resisting cement is particularly used for canal lining.
(b) Low heat cement should not be used for thin concrete structures.
(c) Rapid hardening cement should not be used for massive concrete structures
(d) All of the above 194. (d)

Q195. Match the correct answer
Group A Group B
`1. Bhakra dam (A) High alumina cement
2. Chemical plants (B) Pozzolana cement
3.Not to be used in thin R.C.C. structures. (C)Sulphate resisting cement
4. Marina works (D) Blast furnace slag cement 195. (1)- (B), 2-(A), 3- (D), 4-(C)

Q 196. The degree of grinding of cement is called
(a) Fineness
(b) Soundness
(c)Impact value
(d) Bulking 196. (a)

Q 197. Too much fineness of cement
(a) Results cracks in concrete
(b) Generates greater heat
(c) Develops later strength
(d) All the above 197. (d)

Q 198. According to IS Code , the requirement of an ordinary Portland cement is
(a) The residue does not exceed 10% when sieved through is sieve no .9
(b) Its initial setting time is not less than 30 minutes.
(c) its expansion is not moret han 10mm for unaerated cement
(d) All the above 198.(d)

Q199. The compressive strength an ordinary Portland cement (1:3) after 7 days test should not be less than.
(a) 11N/mm^2
(b) 17.5 N/mm^2
(c) 22 N/mm^2
(d) 27.5N/m^2 199. (b)
Q 200 The percentage of water for making a cement paste of normal consistency varies from
(a) 15 to 25%
(b) 25 to 35%
(c) 35 to 50%
(d) 50 to 60% 200. (b)
Q 201 For performing the compressive strength test of cement, the size of cube mould should be
(a) 7.06cm
(b) 75mm
(c) 80mm
(d) All the above 201. (a)
Q 202. The cubes of cement prepared for compressive strength test should be kept at a temp of _____in an atmosphere of at least 90% humidity of r 24hours
(a) 150 20C
(b) 210 20C
(c) 270 20C
(d) 300 20C 202. (c)
Q 203. The inert mineral material used for the manufacture of mortars and concrete is
(a) Cement
(b) Water
(c) Aggregates
(d) Admixture 203. (c)
Q 204. Accordingly to IS: 383-1970, a good aggregate for concrete construction should be
(a) Chemically inert
(b) Sufficiently strong
(c)Sufficiently hard and durable
(d) All the above 204. (d)
Q 205. For reinforced concrete, the aggregate used is
(a) Sand
(b) Gravel
(c) Crushed rock
(d) All of these 205. (d)

Q 206. For the manufacture of concrete a low density, the aggregate used is
(a) Furnace clinker
(b) Coke breeze
(c)Saw dust
(d) All the above 206. (d)

Q 207. The aggregate which pass through 75mm IS sieve and entirely retain on 4.75 IS sieve is known as
(a) Cyclopean aggregate
(b) Coarse aggregate
(c)Fine aggregate
(d) all-in-aggregate 207. (b)

Q 208. The minimum particle size of fine aggregate is
(a) 0.0075mm
(b) 0.075mm
(c)0.75mm
(d)0.95m 208. (b)
Q 209 The aggregates of _____-shape have minimum voids
(a) Irregular
(b) Angular
(c)Rounded
(d) Flaky 209. (c)

Q 210. The aggregates of _____-shape have maximum voids
(a) Irregular
(b) Angular
(c)Rounded
(d) Flaky 210. (b)

Q 211.Which of the following statement is correct
(a) The maximum size of coarse aggregate should not exceed one fourth of the minimum dimension of the plain concrete member.
(b) The maximum size of coarse aggregate should not exceed one fifty of the minimum dimension of the reinforced concrete member
(c)The aggregates of 40mm, 20mm and 10mm sizes are commonly used for concrete works
(d) All the above 211. (d)

Q 212. An aggregate which may contain some moisture in the pores but having dry surface is known as.
(a) Dry aggregate
(b) Moist aggregate
(c) Saturated surface dry aggregate
(d) All the above 212. (a)

Q 213. An aggregate having all the pores filled with water but having dry surface is called .
(a) Dry aggregate
(b) Moist aggregate
(c) Saturated surface dry aggregate
(d) All the above 213. (c)

Q 214. An aggregate having all the pores are filled with water and also having its surface wet is called
(a) Dry aggregate
(b) Moist aggregate
(c) Saturated surface dry aggregate
(d) All the above 214. (b)

Q 215. The deleterious materials present in the aggregate
(a) Prevent normal hydration of cement
(b) Reduce the strength and durability of concrete.
(c) Modify the setting action and cause efloresecence.
(d) All of the above 215. (d)

Q 216. The resistance of an aggregates to compressive forces is known as
(a) Crushing value
(b) Impact value
(c)Abrasion value
(d) None of these 216. (a)

Q 217. The resistance of an aggregates to wear is known as
(a) Shear value
(b) Crushing value
(c)Abrasion value
(d) Impact value 217. (c)

Q 218. Los Angles machine is used to perform
(a) Crushing strength
(b) Impact test
(c) Water absorption
(d) Abrasion resistance test 218. (d)

Q 219. The value fineness modules for fin sand is
(a) 1.1 to 1.3
(b) 1.3 to 1.6
(c)1.6 to 2.2
(d) 2.2 to 2.6 219. (d)

Q 220. If the fineness modules of sand is 3, then the sand is graded as
(a) Very fine sand
(b) Fine sand
(c)Medium sand
(d) Coarse sand 220. (d)

Q 221 In the reinforced cement concrete structure, the steel reinforcement consists of .
(a) Deformed bars

(b) Cold twisted bars
(c) Mild steel and medium tensile steel bars
(d) All of these 221. (d)

Q222. In singly reinforced beams, steel reinforcement is provided in
(a) Compressive zone
(b) Tensile zone
(c) Neutral zone
(d) All the above 222. (b)

Q223. In a simply supported reinforced concrete beam, the reinforcement is placed.
(a) Above the neutral axis
(b) Below the neutral axis
(c) At the neutral axis
(d) None of these 223. (b)

Q 224. In a singly reinforced beam, the effective depth is measured form the compression edge to the
(a) Tensile edge
(b) Centre of tensile reinforcement
(c) Neutral axis of the beam
(d) All of the above 224. (b)

Q225. The application of elastic theory to the beams is based on the assumption that
(a) At any cross-section, plane sections before bending remain plane after bending
(b) All tensile stresses are taken up by reinforcement alone and none by the concrete.
(c) Steel reinforcement is free from initial stresses when it is embedded in concrete.
(d) All of the above 225. (d)

Q226. In case of a cantilever beam , the tensile zone is D.
(a) Above the neutral axis
(b) Below the neutralaxis
(c) At the neutral axis
(d) All the above 226. (a)

Q227. The limit state method use

(a) partial safety factor
(b) factor of safety
(c) Ultimate factor of safety
(d) None of these 227. (a)

Q228. In a singly reinforced concrete beam, if the load is vey small.
(a) Only concrete will resist tension
(b) Only steel bars will resist tension.

(c) Both concrete & steel will resist tension.
(d) Both concrete & steel will resist compression 228. (c)

Q229. The modular ratio is the ration of
(a) Young's modulus of steel to the young's modulus of concrete
(b) Young's modules of concrete to the young's modulus of steel
(c) Load carried by steel to the load carried by concrete.
(d) Load carried by concrete to the load carried by step 229. (c)

Q230. In a reinforced concrete column, the cross –sectional area of steel bar is as and that of concrete ia AC; the equivalent area of the section n terms of concrete is equal to.
(a) As+mAc
(b) Ac+mAs
(c) As-mAc
(d) Ac-mAs 230. (b)

Q231. In a singly reinforced concrete beam, as the load increases.
(a) Only concrete will resist tension
(b) Only steel bars will resist tension.
(c) Both concrete and steel will resist tension.
(d) Both concrete and steel will resist compression. 231. (b)

Q232. Normally, the tensile strength of concrete is about_____of its compressive strength
(a) 10 to 15%
(b) 15 to 20%
(c) 20 to 25%
(d) 25 to 30% 232. (a)

Q233. If the load on beam is increased, the tensile stress in the concrete below the neutral axis will
(a) Increase
(b) Decrease
(c) Remain unchanged
(d) None of these 233. (a)

Q234. Under normal loading conditions, the tensile stressed setup in the concrete will be _____the permissible stress.
(a) More than
(b) Less than
(c) Equal to
(d) All the above 234. (a)

Q235. A reinforced concrete beam will crack if tensile stress set up in the concrete below the neutral axis is

(a) More than the permissible stress
(b) Less than the permissible stress
(c) Equal to the permissible stress
(d) All the above. 235. (a)

Q 236. In a beam section, if the steel reinforcement is of such a magnitude that the permissible stresses in concrete and steel are developed simultaneously, the section is.
(a) Balanced section
(b) Economical section
(c) Critical section
(d) All the above 236. (d)

Q237. The section in which concrete is not fully stressed to its permissible value when stress in steel reaches its maximum value is
(a) Under-reinforced section
(b) Over-reinforced section
(c) Critical section
(d) Balanced section 237. (a)

Q 238. The actual neutral axis of n under reinforced section is above the critical neutral axis of a balanced section
(a) Correct
(b) Incorrect
(c) Not known
(d) None of these 238. (a)

239. The neutral axis of a balanced section is called
(a) Balanced neutral axis
(b) Critical neutral axis
(c) Equivalent neutral axis
(d) All of these 239. (b)

240. The moment of resistance of an under- reinforced section is computer on the basis of
(a) Compressive force developed in concrete
(b) Tensile force developed in steel
(c) Both (a) & (b)
(d) All the above 240. (b)

241. In a singly reinforced beam, if the stress in concrete reaches its allowable limit later than the steel reaches, its permissible value, the beam section is said to be
(a) Under-reinforced section
(b) Over-reinforced section
(c) Critical section
(d) Balanced section 241. (b)

242. In an over-reinforced section

(a) Steel reinforcement is not fully stressed to its permissible value
(b) Concrete is not fully stressed to its permissible value
(c) Either (a) and (b)
(d) Both (a) and (b) 242. (a)

Q 243. For an over –reinforced (singly reinforced)rectangular reinforced concrete section
(a) The lever arm will be less than that for a balanced section
(b) The maximum stress developed by concrete will be equal to allowable stress in concrete
(c) The maximum stress developed by steel will be equal to the allowable
(d) All the above 243. (b)

Q 244. The moment of resistance of an over-reinforcement section is determined on the basis of
(a) Compressive force developed in concrete
(b) Tensile force developed in steel
(c) Both (a) & (b)
(d) None of these 244. (a)

Q 245. The neutral axis of an over –reinforced section falls
(a) On the critical neutral axis of balanced section.
(b) Below the critical neutral axis of balanced section
(c) Above the neutral axis o balanced section
(d) Al l the above 245. (b)

Q 246. For a balanced section, the moment of resistance obtained from compressive force will be _____the moment of resistance obtained from the tensile force
(a) Greater than
(b) Less than
(c) Equal to
(d) None of these 246. (c)

Q 247. As the percentage of steel in a beam increases, the depth of neutral axis
(a) Increases
(b) Decreases
(c) Equal to
(d) None of these 247. (a)

Q 248. The deep beams are designed for
(a) Shear force only
(b) Bending moment only
(c) Both S.F & B.M
(d) Bearing 248. (b)

Q 249. In a reinforced concrete beam , the shear stress distribution above the neutral axis

following a
(a) A straight line
(b) Circular curve
(c) Parabolic curve
(d) All the above 249. (c)

Q 250. The maximum shear stress in rectangular beam is _____times of average shear stress.
(a) 1.15
(b) 1.25
(c) 1.50
(d) 1.75 250. (c)

Q 251. For a reinforced concrete beam section, the shape of shear stress diagram is
(a) Parabolic over the whole section with maximum value at the neutral axis.
(b) Parabolic above the neutral axis and rectangular below the neutral axis.
(c) Linearly varying as the distance form the N.A.
(d) All the above 251. (b)

Q 252 As per the provisions of IS: 456-2000, in limit state method for, design f beams, the limiting value of the depth of neutral axis in a reinforced concrete beam of effective depth 'd' I given as **(Gate 2002: 2 marks)**

(a) 0.53 d (b) 0.48 d (c) 0.46 d (d) any of the above depending on the different grade of steel 252. (d)

Q 253 maximum strain in an extreme fibre in concrete and in the tension reinforcement (Fe-415 grade and Es = 200 kN/mm^2) in a balanced section at limit state of flexure are respectively **(Gate 2003: 2 marks)**

(a) 0.0035 and 0.0038
(b) 0.002 and 0.0018
(c) 0.0035 and 0.0041
(d) 0.002 and 0.0031 253. (a)

Q 254 the working stress method of design specifies the value of modular ratio, m = 280/(3 σcbc), where σcbc is the allowable stress in bending compression in concrete. to what extent does the above value of 'm' make any allowance for the creep of concrete?
(Gate 2003: 1 marks)
(a) No compensation (b) Full compensation (c) Partial compensation (d) The two are unrelated 254. (c)

Q 255 List-I contains some properties of concrete/ cement and List-II contains list of some tests on concrete/cement. Match the property with the corresponding test. **(Gate 2003: 1 marks)**

List-1
(A) Workability of concrete
(B) Direct tensile strength of concrete
(C) Bond between concrete and steel
(D) Fineness of cement
List-II
1. Cylinder splitting test
2.Vee-Bee test
3. Surface area test
4.Fineness modulus test
5.Pull out test
Codes

(a)	(A)	(B)	(C)	(D)
(b)	2	1	5	3
(c)	4	5	1	3
(d)	2	5	1	4

255. (b)

Q 256 in the limit state design method of concrete structures, the recommended partial material safety factor (ϒm) for steel according to **(Gate 2004: 1 marks)**

(a) 1.5 (b) 1.15 (c) 1.00 (d) 0.87 256. (b)

Q 257 For avoiding the limit state of collapse, the safety of RC structures is checked for appropriate combinations of Dead Load (DL), Imposed Load (IL), Wind Load (WL) and Earthquake Load (EL). Which of the following load combinations is NOT considered?
(Gate 2004: 1 marks)

(a) 0.9 DL + 1.5 WL

(b) 1.5 DL + 1.5 WL

(c) 1.5 DL + 1.5 WL + 1.5 EL

(d) 1.2 DL + 1.2 IL +1.2 WL 257. (c)

Q 258 The partial factor of safety for concrete as per IS: 456-2000 is**(Gate 2005: 1 marks)**

(a) 1.50 (b) 1.15 (C) 0.87 (d) 0.446 258. (b)

Q 259 The flexural strength of M 30 concrete as per IS: 456-2000 is**(Gate 2005: 2 marks)**

(a) 3.83 MPa (b) 5.47 MPa (c)21.23 MPa (d) 30.0 MPa 259. (a)

Q 260 In a random sampling procedure for cube strength of concrete, one sample consists of X number of specimens. These specimens are tested at 28 days and average strength of these X specimens is considered as test result of the sample, provided the individual variation in the

strength of specimens is not more than ± Y percent of the average strength. The values of X and Y as per IS 456-2000 are **(Gate 2005: 2 marks)**

(a) 4 and 10respectivaly

(b) 3 and 10 respectively

(c) 4 and 15 respectively

(d) 3 and 15 respectively 260. (d)

Q 261 if the characteristic strength of concrete fck is defined as the strength below which not more than 50% of the test results are expected to fall, the expression for fck in terms of mean strength fm and standard deviation S would be **(Gate 2006: 1 marks)**

(a) fm – 0.1645S (b) fm – 1.645S (c) fm (d) fm + 1.645S 261. (c)

Q 262 Assuming concrete below the neutral axis to be cracked, the shear stress across the depth of a singly reinforced rectangular beam section **(Gate 2006: 2 marks)**

(a) increase parabolically to the neutral axis and then drops suddenly to zero value

(b) increase parabolically to the neutral axis and then remains constant up to the tension steel

(c) increase parabolically to the neutral axis and then remains constant over the remaining steel

(d) increase parabolically to the neutral axis and then remains constant up to the tension steel.

262. (a)

Q 263 As per IS 456-2000. Consider the following statements

(1) The modular ratio considered in the working stress method depends on the type of steel used

(2) There is an upper limit on the nominal shear stress in beams (even with shear reinforcement) due to the possibility of crushing of concrete in diagonal compression

(3) A rectangular slab whose length is equal to its width may not be a two way slab for some support conditions

The TRUE statements are **(Gate 2006: 2 marks)**

(a) 1 and 2 (b) 2 and 3 (c) 1 and 3 (d) 1, 2 and 3 263. (2)

Q 264 A reinforced concrete structure has to be constructed along a sea cost. The minimum grade of concrete to be used as per IS 456-2000 is **(Gate 2008: 1 marks)**

(a) M 15 (b) M20 (c) M25 (d) M30 264. (d)

Q 265 For limit state of collapse , the partial safety factors recommended by IS 456-2000 for estimating the design strength of concrete and reinforcing steel are respectively **(Gate 2008: 1 marks)**

(a) 1.15 and 1.5 (b) 1.0 and 1.0 (c) 1.5 and 1.15 (d) 1.5 and 1.0

265. (c)

Q 266 select the correct answer using the codes given below the list **(Gate 2008: 1 marks)**

List I

A. Resonant frequency test

B. Rebound hammer test

C. Split cylinder test

D. Compacting factor test

List II

1. Tensile **strength**

2. Dynamic modulus of elasticity

3. Workability

4. Compressive strength

Codes

	A	**B**	**C**	**D**
(a)	**2**	**4**	**1**	**3**
(b)	**2**	**1**	**4**	**3**
(C)	**2**	**4**	**3**	**1**
(d)	**4**	**3**	**1**	**2**

266. (a)

Q 267 The cross section of a thermo-mechanically treated (TMT) reinforcing has **(Gate 2011: 1 marks)**

(a) Soft ferrite-pearalite throughout

(b) hard martensite throughout

(c) a soft ferrite-pearalite core with a hard martensitc rim

(d) a hard martensitc core with a soft pearilte-bainitic rim 267. (c)

Q 268 As per IS 456:2000, in the limit state design of a flexural member, the strain in reinforcing bars under tension at ultimate state should not be less than **(Gate 2012: 1 marks)**

(a) fy/Es (b) (fy/Es) +0.002 (c) fy/1.15Es (d)(fy/1.15Es) + 0.002 268. (4)

Q 269 Maximum value of compaction factor for fresh (green) concrete is **(Gate 2013: 1 marks)**

(a) 0.5 (b) 1.0 (c) 1.5 (d) 2.0 269. (b)

Q 270 if Ø= nominal dia of reinforcing bar, f_s = compressive stress in the bar and f_{bd} = design bond stress of concrete, the anchorage length, La of straight bar in compression is equal to **(Gate 1996:1 Marks)**

(a) La = Ø x f_s/ f_{bd} (b) La = Ø x f_s/2x f_{bd} (c) La = Ø x f_s/ϖ f_{bd} (d) La = Ø x f_s/4x f_{bd}

270. (d)

Q 271 in the design of a reinforced concrete beam the requirement for bond is not getting satisfied. The economical option to satisfy the requirement for bond is by **(Gate 1996:1 Marks)**

(a) bundling of bars

(b) providing smaller diameter bars more in number

(c) providing larger diameter bars less in number

(d) providing same diameter bars more in number 271. (c)

Q 272 The lateral ties in a reinforced concrete rectangular column under axial compression are used to **(Gate 1996:1 Marks)**

(a) avoid the buckling of the longitudinal steel under compression

(b) provide adequate shear capacity

(c) provide adequate confinement to concrete

(e) reduce the axial deformation of the column 272. (a)

Q 273 Which one of the following set of values give the minimum clear cover (in mm) for the main reinforcement in the slab, beam, column and footing respectively, accordance to IS : 456-1978? **(Gate 1995:1 Marks)**

(a) 20, 25, 30, 75 (b) 5, 15, 25, 50 (c) 15, 25, 40, 75 (d) none of these

273. (c)

Q 274 In a reinforced concrete beam column, the increase in the flexural strength along with the increase in the axial strength occurs **(Gate 1995:1 Marks)**

(a) beyond the elastic limit of the material

(b) when the yielding of the tension reinforcement governs the strength

(c) when the crushing of the concrete in the compression zone governs the strength

(d) never 274. (b)

Q 275 the permissible bending tensile stress in concrete for the vertical wall of an RC water tank made of M 25 concrete is **(Gate 1997:1 Marks)**

(a) 8.5 N/mm^2 (b) 6.0 N/mm^2 (c) 2.5 N/mm^2 (d) 1.8 N/ mm^2

275. (d)

Q 276 IS 456: 1978 recommends to provide certain minimum steel in a RCC beam **(Gate 1997:1 Marks)**

(a) to ensure compression failure

(b) to avoid rupture of steel in case a flexural failure occurs

(c) to hold the stirrups steel in position

(d) to provide enough ductility to the beam 276. (b)

Q 277 the effective length of a column in a reinforced concrete building frame, as per IS 456-2000, is independent of the **(Gate 2003:1 Marks)**

(a) frame type i.e., braced (no sway) or unbraced (with sway)

(b) span of the beam

(c) height of the column

(d) loads acting on the frame 277. (b)

Q 278 The loss of prestress due to elastic shortening of concrete is least in **(Gate 1992:1 Marks)**

(a) one wire pre-tensioned beam

(b) multiple wire pre- tensioned beam with sequential cutting of wires

(c) multiple wire post-tensioned beam subjected to sequential prestressing 278. (a)

Q 279 IS 1343:1980 limits the minimum characterstics strength of pre-stressed concrete for post tensioned work and pretensioned work and pretension work as **(Gate 2005 :1 Marks)**

(a) 25 MPa, 30 MPa respectively

(b) 25 MPa, 35 MPa respectively

(c) 30 MPa, 35 MPa respectively

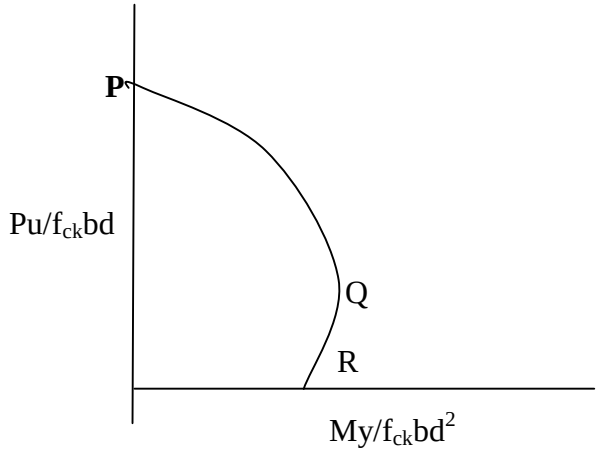
(d) 30 MPa, 40 MPa respectively 279. (d)

Q 280 As per Indian standard code of practice for prestressed concrete (IS:1343-1980) the minimum grades of concrete to be used for post tensioned and pre-tensioned structural elements are respectively

(a) M20 for both (b) M40 and M30 (c) M15 and M20 (d) M30 and M40

280. (d)

Q 281 Interaction diagram of a rectangular reinforced concrete beam column is shown in the figure. With reference to this figure, which of the following statements in (a) and in (b) below the correct ?



(a) Point Q represents balanced failure

(b)Point R represents balanced failure

(c) Point P represents balanced failure

(d) Point Q represents balanced failure under maximum eccentric compression

281. (a)

Q 282 To determine the modulus of rupture, the size of test specimen used is

(a) 150 x 150 x150 mm

(b) 100 x 100 x 700mm

(c) 150 x 150 x 700 mm

(d) 100 x 100 x 500 mm 282. (c)

Q 283 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 283. (b)

Q 284 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

(e) none of the above 284. (e)

Q 285 Workability of concrete is inversely proportional to

(a) time to transit

(b) water-cement ratio

(c) the air in the mix

(d) size of aggregate 285. (a)

Q 286 Approximate value of shrinkage strain in concrete, is

(a) 0.003

(b) 0.0003

(c) 0.00003

(d) 0.03 286. (b)

Q 287 Air entrainment in the concrete increases

(a) Workability

(b) Strength

(c) the effect of temperature variations

(d) The unit weight 287. (a)

Q 288 The relation between modulus of rupture fcr, splitting strength fcs and direct tensile strength fct is given by

(a) fcr= fcs= fct

(b) fcr> fcs>fct

(c) fcr<fcs<fct

(d) fcs> fcr> fct 288. (b)

Q289 The approximate value of the ratio between direct tensile strength and flexural strength is

(a) 0.33 (b) 0.5 (c) 0.75 (d) 1.0 289. (b)

Q 290 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 290. (b)

Q 291 The side face reinforcement, if required, in a T-beam will be (ES-93)

(a) 0.1% of the web area

(b) 0.15% of the web area

(c) 0.2% to 0.3% of the web area depending upon the breadth of the web

(d) half the longitudinal reinforcement 291. (a)

Q 292 The loads to be taken corresponding to limit states of strength, defelection and crack width are respectively (ES 93)

(a) working load, working load and working load

(b) ultimate load, working load and ultimate load

(c) ultimate load, ultimate load and working load

(d) ultimate load, working load and working load 292. (d)

Q 293 Consider the following statements: (ES 94)

For an over reinforced (singly reinforced) rectangular RC section

1. the lever arm will be less than that for a balanced section

2. the maximum stress developed by steel would equal the allowable stress in steel

3 the maximum stress developed by concrete would equal allowable stress in concrete

Of these statements

(a) 1 and 2 are correct

(b) 1 and 3 are correct

(c) 2 and 3 are correct

(d) 1,2 and 3 are correct 293. (b)

Q 294 The hope stress in a dome subjected to uniform distributed load (ES 94)

(a) is always compressive

(b) is tensile at sections whose radius vectors are at angles less than 51° 51′ with the vertical

(c) is tensile at sections whose radius vectors are at angles greater than 51° 51′ with the vertical

(d) is always tensile 294. (b)

Q 295 in case of 2-way slab, the limiting deflection of the slab is (ES 94)

(a) Primarily a function of the long span

(b) Primarily a function of the short span

(c) Dependent on both long and short span

(d) Independent of long or short span 295. (b)

Q 296 From limiting deflection point of view, use of high strength steel in RC beam results in (ES 95)

(a) reduction in depth

(b) no change in depth

(c) increase in depth

(d) increase in width 296. (c)

Q 297 In limit state approach, spacing of main reinforcement controls primarily (ES 96)

(a) collapse (b) cracking (c) deflection (d) durability 297. (b)

Q 298 Unequal top and bottom reinforcement in a reinforced concrete section leads to

(a) Creep deflection

(b) Shrinkage deflection

(c) long term deflection

(d) large deflection 298. (b)

Q 299 the final deflection due to all loads including the effects of temperature, creep and shrinkage and measured from as-cast level of support of floors, roofs and all other horizontal members should not exceed (ES 97)

(a) Span/350

(b) span/ 300

(c) span/250

(d) span/200 299. (c)

Q 300 A reinforced concrete slab 75 mm thick. The maximum size of reinforcement bar that can be used is (ES 97)

(a) 12 mm dia

(b) 10 mm dia

(c) 8mm dia

(d) 6mm dia 300. (b)

Q 301 W_p and W_f are the weights of a cylinder containing partially compacted and fully compacted concrete. If the compaction factor $\left(\frac{W_p}{W_f}\right)$ is 0.95, the workability of concrete is

1. extremely low

2. very low

3. Low

4. High

5. none of these. 301. (4)

Q 52 economic spacing of the truss is the spacing that make overall cost of trusses, purlins, roof coverings, columns etc. minimum

It depends upon

(i) relative cost of truss

(ii) purlins

(iii) roof coverings

(iv) spacing of columns, etc.

For economical spacing, cost of trusses.

T=2p+r (p=cost of purlins, r= cost of roof covering

Q 71 Read the following two statements **(2000: 1 mark)**

(1) Maximum strain in concrete at the outermost compression fiber is taken to be 0.0035 in bending

(2) The maximum compressive strain in concrete in axial compression is taken as 0.002

Keeping the provisions of IS 456:2000on limit state design in mind, which of the following is true:

(a) Statement I is true but II is false

(b) Statement I is false but II is true

(c) Both statement I and II are true

(d) Both statement I and II are false