

1. For construction of structures under water, the type of lime used is \_\_\_\_\_.

- A. hydraulic lime
- B. fat lime
- C. quick lime
- D. pure lime

Ans. A.

For construction of structures under water, hydraulic lime is used. Fat lime lime can not be used due to its poor setting in wet conditions.

2. The compound of Portland cement which reacts immediately with water and also sets first is \_\_\_\_\_.

- A. Tri-calcium silicate
- B. Di-calcium silicate
- C. Tri-calcium aluminate
- D. Tetra calcium alumino ferrite

Ans. C.

Tri-calcium aluminate is the first bogus compound formed when water is added to the cement, this compound is formed with 24 hour and it produces the maximum heat of evolution.

3. Rapid hardening cement attains early strength due to \_\_\_\_\_.

- A. larger proportion of lime grounded finer than normal cement
- B. lesser proportion of lime grounded coarser than normal cement
- C. lesser proportion of lime grounded finer than normal cement
- D. larger proportion of lime grounded coarser than normal cement

Ans. C.

Rapid hardening cement attains early strength due to larger proportion of lime grounded finer than normal cement. Finer grinding of cements leads to increase in heat of evolution, and attains the early strength.

4. The percentage of water for normal consistency is \_\_\_\_\_.

- A. 5% to 15%
- B. 10% to 25%
- C. 15% to 25%
- D. 20% to 30%

Ans. C.

The percentage of water for normal consistency is 15% to 25% required for complete hydration.

5. Soundness test of cement determines \_\_\_\_\_.

- A. quality of free lime
- B. ultimate strength
- C. durability
- D. initial setting

Ans. A.

Soundness test of cement determines the free lime content, lime is very prone to volume increase on reacting with water. If free lime content is more then soundness will be more which is a undesirable property for good cement.

6. Bulking of sand is caused due to \_\_\_\_\_.

- A. surface moisture
- B. air voids
- C. viscosity
- D. clay contents

Ans. A.

Bulking of sand is caused due to surface moisture, when sand contains 4 to 6% of moisture content a thin layer of water surface form around the sand particle which increases the volume of sand, is known as bulking of sand.

7. For a 50 kg cement bag, water required is \_\_\_\_\_.

- A. 16.5 liters
- B. 18.5 liters
- C. 20.5 liters
- D. 22.5 liters

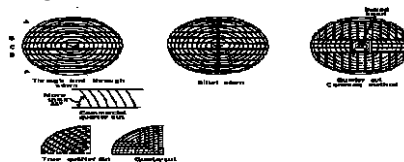
Ans. D.

For a 50 kg cement bag, water required is 22.5 liters for complete hydration of cement.

8. Pick up the correct statement from the following Method of sawing timber \_\_\_\_\_.

- A. tangentially to annual rings, is known as tangential method
- B. in four quarters such that each board cuts annual rings at angles not less than 45°, is known as quarter sawing method
- C. cut out of quarter logs, parallel to the mudullary rays and perpendicular to annual rings is known as radial sawing
- D. All options are correct

Ans. D.



9. For the manufacture of plywood, veneers are placed so that grains of adjacent veneers are \_\_\_\_\_.

- A. at right angles
- B. parallel
- C. inclined at 45°
- D. inclined at 60°

Ans. A.

For the manufacture of plywood, veneers are placed so that grains of adjacent veneers are at right angles. on placing at right angles plywood equally strong in tension and compressions and not deflected in particular direction.

10. The portion of the brick without a triangular corner equal to half the width and half the length is called \_\_\_\_\_.

- A. closer
- B. queen closer
- C. king closer
- D. squint brick

Ans. C.

The portion of the brick without a triangular corner equal to half the width and half the length is called king closer, and with triangular corner is known as queen closer.

11. The height of the sink of wash basin above floor level is kept \_\_\_\_\_.

- A. 60 cm
- B. 70 cm
- C. 75 cm to 80 cm
- D. 80 cm

Ans. C.

The height of the sink of wash basin above floor level is kept 75 to 80 cm for easy free vortex formation into the sink basin.

12. Pick up the correct statement from the following.

- A. In order to check up the average depth of excavation, 'Dead mans' are left at the mid-widths of borrow pits
- B. The earthwork calculation in excavation is made from the difference in levels obtained with a level
- C. The earthwork done in excavation is to form the road embankment includes the formation of correct profiles and depositing the soil in layers
- D. All options are correct

Ans. D.

Excavation work does not include the top soiling and rest of the things are correct related to the excavation of average depth, excavation calculation, formation of correct profiles and depositing the soil in layers necessary for road embankment by excavation of earth.

13. If the formation level of a highway has a uniform gradient for a particular length and the ground is also having a longitudinal slope, the earthwork may be calculated by \_\_\_\_\_.

- A. Mid-section formula
- B. Trapezoidal formula
- C. Prismoidal formula
- D. All options are correct

Ans. D.

If the formation level of a highway has a uniform gradient for a particular length and the ground is also having a longitudinal slope, the earthwork may be calculated by Mid-section formula, Trapezoidal formula, Prismoidal formula.

14. The area of a sloping surface of a protective embankment of mean height  $d$ , side slopes  $S:1$  and length  $L$  is \_\_\_\_\_.

- A.  $d \times d \times s$
- B.  $\sqrt{[(d^2 \times (ds^2))]}$
- C.  $L \cdot D \sqrt{(1+s^2)}$
- D.  $2 Ld \sqrt{(1+s^2)}$

Ans. C.

The area of a sloping surface of a protective embankment of mean height  $d$ , side slopes  $S:1$  and length  $L$  is  $L \cdot D \sqrt{(1+s^2)}$

15. A cement concrete road is 1000 m long, 8 m wide and 15 cm thick over the sub-base of 10 cm thick gravel. The cubic content of concrete (1:2:4) for the road specified in is \_\_\_\_\_.

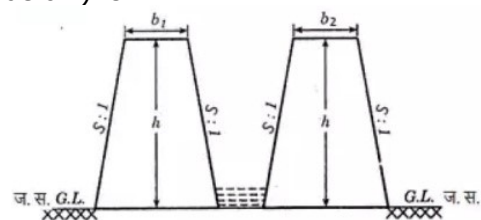
- A. 300 m<sup>3</sup>
- B. 600 m<sup>3</sup>
- C. 900 m<sup>3</sup>
- D. 1200 m<sup>3</sup>

Ans. D.

the sub-base of 10 cm thick gravel bed is not required the concrete so calculation only done for the length, width, and thickness of concrete pavement.

$$V = 1000 \times 8 \times 0.15 = 1200 \text{m}^3$$

16. The cross-sectional area of the embankment of a canal fully in embankment, (refer the figure given below) is:-



- A.  $1/2(b_1+b_2)h$
- B.  $(b_1+b_2)h+Sb^2$
- C.  $(b_1+b_2)+2Sh^2$
- D.  $2[(b_1+b_2)(b+Sh)]$

Ans. C.

the cross-sectional area of the embankment of a canal fully in embankment is

$$(b_1+b_2)+2Sh^2$$

17. The following item of earthwork is not measured separately \_\_\_\_\_.

- A. Setting out of works
- B. Site clearance
- C. dead men
- D. All options are correct

Ans. D.

All these earth work is measured simultaneously as Setting out of works, Site clearance, dead men

18. Pick up the incorrect statement from the following \_\_\_\_\_.

- A. No deduction is made for the volume occupied by reinforcement
- B. No deduction is made for the openings up to 0.1 sq.m
- C. No deduction is made for volumes occupied by pipes, not exceeding 100 sq. cm in cross- section
- D. None of the these

Ans. D.

No deduction is made for the volume occupied by reinforcement, No deduction is made for the openings up to 0.1 m<sup>2</sup>, No deduction is made for volumes occupied by pipes, not exceeding 100 cm<sup>2</sup> in cross-section.

19. While estimating a reinforced cement structure the omitted cover of concrete is assumed \_\_\_\_\_.

- A. at the end of reinforcing bar, not less than 25 mm or twice the diameter of the bar
- B. in thin slabs, 12 mm minimum or diameter of the bar whichever is more
- C. for reinforcing longitudinal bar in a beam 25 mm minimum or diameter of the largest bar which is more
- D. All options are correct

Ans. D.

While estimating a reinforced cement structure the omitted cover of concrete is assumed, at the end of reinforcing bar, not less than 25 mm or twice the diameter of the bar, in thin slabs, 12 mm minimum or diameter of the bar whichever is more, for reinforcing longitudinal bar in a beam 25 mm minimum or diameter of the largest bar which is more.

20. For 100 sq. m cement concrete (1:2:4) 4 cm thick floor, the quantity of cement required is \_\_\_\_\_.

- A. 0.90 m<sup>3</sup>
- B. 0.94 m<sup>3</sup>
- C. 0.98 m<sup>3</sup>
- D. 1.00 m<sup>3</sup>

Ans. B.

Dry volume of concrete is 165% of wet volume of concrete

The volume of concrete (wet) = 100 x 0.04 = 4 m<sup>3</sup>

Dry volume will be = 4 x 1.65 = 6.60 m<sup>3</sup>

So quantity of concrete will be = volume of dry concrete x cement proportion into the concrete, = 6.60 x (1/7) = 0.94 m<sup>3</sup>

21. If h is the difference in height between end points of a chain of length the required slope correction is \_\_\_\_\_.

- A.  $h^2/(2l)$
- B.  $h/(2l)$
- C.  $h^2/l$
- D.  $h^2/(4l)$

Ans. A.

If h is the difference in height between end points of a chain of length the required slope correction is  $h^2/(2l)$ . Slope correction negative in nature.

22. Correction per chain length of 100 links along a slope of a radians is \_\_\_\_\_.

- A.  $100 a^2$
- B.  $100 a$
- C.  $100 a^3$
- D.  $100 a^{(-1)}$

Ans. B.

Correction per chain length of 100 links along a slope of a radians is  $100 a$ .

Correction is applied to per chain link and a is the correction factor.

23. Check lines (or proof lines) in Chain Surveying are essentially required \_\_\_\_\_.

- A. to plot the chain lines
- B. to plot the offsets
- C. to indicate the accuracy of the survey work
- D. to increase the out-turn

Ans. C.

Check lines (or proof lines) in Chain Surveying are essentially required to indicate the accuracy of the survey work.

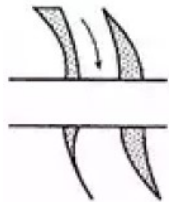
24. For taking offsets with an optical square on the right hand side of the chain line it is held \_\_\_\_\_.

- A. by right hand upside down
- B. by left hand upright
- C. by right hand upright
- D. by left hand upside down

Ans. B.

For taking offsets with an optical square on the right hand side of the chain line it is held by left hand upright. While For taking offsets with an optical square on the left hand side of the chain line it is held by right hand upright.

25. The conventional sign shown in the figure below represents a.



- A. road bridge
- B. railway bridge
- C. canal bridge
- D. aqua duct

Ans. C.

The conventional sign is the canal bridge.



26. In an adjusted level when the bubble is central, the axis of the bubble tube becomes parallel to \_\_\_\_\_.

- A. line of sight
- B. line of collimation
- C. axis of the telescope
- D. None of the these

Ans. A.

In an adjusted level when the bubble is central, the axis of the bubble tube becomes parallel to line of sight.

27. An internal focusing type surveying telescope may be focused by the movement of \_\_\_\_\_.

- A. objective glass of the telescope
- B. convex-lens in the telescope
- C. concave lens in the telescope
- D. plano-convex lens in the telescope

Ans. C.

An internal focusing type surveying telescope may be focused by the movement of concave lens in the telescope. For removal of parallax in the setting operation.

28. A dumpy level is set up with its eye-piece vertically over a peg A. The height from the top of peg A to the center of the eye-piece is 1.540 m and the reading on peg B is 0.705 m. The level is then setup over B. The height of the eye-piece above peg B is 1.490 m and a reading on A is 2.195 m. The difference in level between A and B is \_\_\_\_\_.

- A. 2.900 m
- B. 3.030 m
- C. 0.770 m
- D. 0.785 m

Ans. C.

This is the reciprocal leveling, Dumpy level set up some where, the reading at A =  $h_A = 1.540m$

The reading at B =  $h_B = 0.705m$

And when dumpy level at B then reading at A =  $h'_A = 2.195m$

And at B =  $h'_B = 1.490m$

The difference in level between A and B is =  $[(h_A - h_B) + (h'_A - h'_B)]/2 = 0.770m$

29. The constant vertical distance between two adjacent contours is called \_\_\_\_\_.

- A. horizontal interval
- B. horizontal equivalent
- C. vertical equivalent
- D. contour interval

Ans. D.

The constant vertical distance between two adjacent contours is defined as the counter interval. In interval is small it is steep gradient.

30. The direction of steepest slope on a contour is \_\_\_\_\_.

- A. along the contour
- B. at an angle of  $45^\circ$  to the contour
- C. at right angles to the contour
- D. None of these

Ans. B.

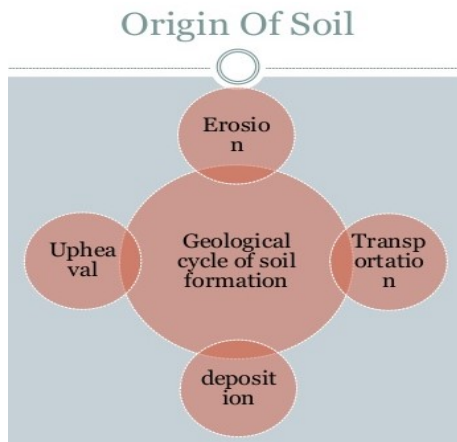
The direction of steepest slope on a contour is at right angles to the contour.

31. Geologic cycle for the formation of soil, is \_\_\_\_\_.

- A. Upheaval → transportation → deposition → weathering
- B. Weathering → upheaval → transportation → deposition
- C. Transportation → upheaval → weathering → deposition
- D. weathering → transportation → deposition → upheaval

Ans. D.

Geologic cycle for the formation of soil, is weathering → transportation → deposition → upheaval.



32. Water content of a soil sample is the difference of the weight of the given sample at the given temperature and the weight determined after drying it for 24 hours at temperatures ranging from \_\_\_\_.

- A. 80° to 90° C
- B. 90° to 95° C
- C. 95° to 100° C
- D. 105° to 110° C

Ans. D.

This is the oven dry method of determination of water content the temperatures ranging from 105° to 110° C specially in case of inorganic soil. For organic soil the temperature ranges from 80° to 85° C.

33. Fundamental relationship between dry density ( $\gamma_d$ ), bulk density ( $\gamma$ ) and water content ( $\omega$ ) is \_\_\_\_.

- A.  $\gamma = \gamma_d / (1 + \omega)$
- B.  $\gamma_d = \gamma / (1 + \omega)$
- C.  $\omega = \gamma / (1 + \gamma_d)$
- D.  $\omega = \gamma / (1 - \gamma_d)$

Ans. B.

Fundamental relationship between dry density ( $\gamma_d$ ), bulk density ( $\gamma$ ) and water content ( $\omega$ ) is  $\gamma_d = \gamma / (1 + \omega)$

34. Pick up the correct statement from the following \_\_\_\_.

- A. The void ratio in soils is defined as the ratio of the volume of voids to the volume of solids
- B. The porosity of a soil is defined as the ratio of the volume of voids to the gross volume of the soil
- C. The bulk density of a soil is defined as the unit weight of the soil
- D. All options are correct

Ans. D.

The void ratio in soils is defined as the ratio of the volume of voids to the volume of solids ( $V_v/V_s$ ), The porosity of a soil is defined as the ratio of the volume of voids to the gross volume of the soil ( $V_v/V$ ), The bulk density of a soil is defined as the unit weight of the soil.

35. Alcohol is used in manometer, because \_\_\_\_.

- A. its vapor pressure is low
- B. it provides suitable meniscus for the inclined tube
- C. its density is less
- D. it provides longer length for a given pressure difference

Ans. A.

Alcohol is used in manometer, because its vapor pressure is low. In manometer low pressure fluid gives quite satisfactory result.

36. The property of fluid by virtue of which it offers resistance to shear is called \_\_\_\_.

- A. surface tension
- B. adhesion
- C. cohesion
- D. viscosity

Ans. D.

The property of fluid by virtue of which it offers resistance to shear is called viscosity.

As newton's law  $\tau = \mu (du/dy)$

$\tau$  = shear stress,  $\mu$  = viscosity,  $(du/dy)$  = velocity gradients.

37. The unit of kinematic viscosity is \_\_\_\_.

- A.  $m^2/sec$
- B.  $kg-sec/m^2$
- C.  $newton-sec/m^2$
- D.  $newton-sec^2/m$

Ans. A.

The unit of kinematic viscosity is  $m^2/sec$   
kinematic viscosity = density of liquid / dynamic viscosity.

38. The total pressure on the surface of a vertical sluice gate 2m x 1m with its top 2 m surface being 0.5 m below the water level will be \_\_\_\_.

- A. 500 kg
- B. 1000 kg
- C. 1500 kg
- D. 2000 kg

Ans. D.

The total pressure on sluice gate will be given by  $W \times A \times Y = 2000 \text{ kg}$

$W$  = density of water =  $1000 \text{ kg/m}^3$

$A$  = area  $2 \times 1 = 2 \text{ m}^2$

$Y$  = distance from water surface =  $0.5 + (1/2) = 1 \text{ m}$



39. Meta-centric height is given as the distance between \_\_\_\_\_.

- A. the centre of gravity of the body and the meta-centre
- B. the centre of gravity of the body and the centre of buoyancy
- C. the centre of gravity of the body and the centre of pressure
- D. centre of buoyancy and meta-centre

Ans. A.

Meta-centric height is given as the distance between the centre of gravity of the body and the meta-centre.

40. The difference of pressure between the inside and outside of a liquid drop is \_\_\_\_\_.

- A.  $p = T \times r$
- B.  $p = T/r$
- C.  $p = T/2r$
- D.  $p = 2T/r$

Ans. D.

The difference of pressure between the inside and outside of a liquid drop is  $2T/r$

41. The property by which a liquid opposes relative motion between its different layers is called \_\_\_\_\_.

- A. surface tension
- B. co-efficient of viscosity
- C. viscosity
- D. osmosis

Ans. C.

The property by which a liquid opposes relative motion between its different layers is called viscosity.

42. The atmospheric pressure with rise in altitude decreases \_\_\_\_\_.

- A. linearly
- B. first slowly then steeply
- C. first steeply and then gradually
- D. unpredictable

Ans. B.

The atmospheric pressure with rise in altitude decreases first slowly then steeply.

43. Barometer is used to measure \_\_\_\_\_.

- A. pressure in pipes, channels etc.
- B. atmospheric pressure
- C. very low pressure
- D. difference of pressure between two points

Ans. B.

Barometer is used to measure atmospheric pressure.

44. Flow meters based on obstruction principle like orifice plates can be used with Reynold's number upto approximately \_\_\_\_\_.

- A. 500
- B. 1000
- C. 2000
- D. 4000

Ans. C.

Flow meters based on obstruction principle like orifice plates can be used with Reynold's number upto approximately 2000, above 2000 this flow shows transition and more than 4000 shows turbulent behaviour.

45. The state of the soil when plants fail to extract sufficient water for their requirements is \_\_\_\_\_.

- A. maximum saturated point
- B. permanent wilting point
- C. ultimate utilization point
- D. None of these

Ans. B.

Permanent wilting point is defined as when plant fails to extract sufficient water to growth of crop. And finally plant wiltup.

46. The field capacity of a soil is 25%, its permanent wilting point is 15% and specific dry unit weight is 1.5. If the depth of root zone of a crop is 80 cm, the storage capacity of the soil is \_\_\_\_\_.

- A. 8 cm
- B. 10 cm
- C. 12 cm
- D. 14 cm

Ans. C.

the storage capacity of the soil is =  $[(\gamma \times d) \times (FC - WP)] / \gamma_w = 0.12 \text{ m} = 12 \text{ cm}$   
 $\gamma = 1.5, FC = 25\%, WP = 15\%, \gamma_w = 1$

47. According to the recommendations of Nagpur Conference the width formation of an ideal National Highway in hard rock cutting is \_\_\_\_\_.

- A. 8.9 m
- B. 7.9 m
- C. 6.9 m
- D. 6.5 m

Ans. B.

Nagpur conference is the 2<sup>nd</sup> 20 year program which held at Nagpur (1961-1981)

According to the recommendations of Nagpur Conference the width formation of an ideal National Highway in hard rock cutting is 7.9 m

48. If  $L$  is the length of a rail and  $R$  is the radius of a curve, the versine  $h$  for the curve is \_\_\_\_\_.

- A.  $a = L/4R$
- B.  $a = L^2/4R$
- C.  $h = L^2/8R$
- D.  $h = L^2/16R$

Ans. C.

If  $L$  is the length of a rail and  $R$  is the radius of a curve, the versine  $h$  for the curve is  $h = L^2/8R$

49. Pick up the incorrect statement from the following.

- A. Manholes are provided in sewer pipes at suitable intervals
- B. Catch basins are generally provided in sewers for carrying drainage discharge
- C. Inlets are generally provided in all sewers
- D. None of the these

Ans. C.

Inlets are not generally provided in all sewers, Manholes are provided in sewer pipes at suitable intervals, Catch basins are generally provided in sewers for carrying drainage discharge.

50. If  $q$  is the average sewage flow from a city of population  $P$ , the maximum sewage flow \_\_\_\_\_.

- A.  $Q = [(4 + \sqrt{P}) / (18 + \sqrt{P})]q$
- B.  $Q = [(18 + P) / (4 + \sqrt{P})]q$
- C.  $Q = [(18 + \sqrt{P}) / (4 + \sqrt{P})]q$
- D.  $Q = [(5 + \sqrt{P}) / (15 + \sqrt{P})]q$

Ans. C.

If  $q$  is the average sewage flow from a city of population  $P$ , the maximum sewage flow  $Q = [(18 + \sqrt{P}) / (4 + \sqrt{P})]q$

51. A body is said to be in equilibrium if \_\_\_\_\_.

- A. it moves horizontally
- B. it moves vertically
- C. it rotates about its C.G.
- D. None of these

Ans. D.

A body is said to be in equilibrium if it remain its position toward the original position.

52. The forces acting normally on the cross section of a bar shown in the figure given below



- A. Compressive stress
- B. tensile stress
- C. shear stress
- D. None of these

Ans. A.

The forces acting normally on the cross section of a bar shown in the figure given below compressive in nature.

53. At yield point of a test piece, the material \_\_\_\_\_.

- A. obeys Hooke's law
- B. behaves in an elastic manner
- C. regains its original shape on removal of the load
- D. undergoes plastic deformation

Ans. D.

At yield point of a test piece, the material undergoes plastic deformation. When material obeys hooks law it is the limit of proportionality, when material regains its original shape on removal of the load it is the elastic limit.

54. If a concrete column  $200 \times 200$  mm in cross-section is reinforced with four steel bars of  $1200 \text{ mm}^2$  total cross-sectional area. What is the safe load for the column if permissible stress in concrete is  $5 \text{ N/mm}^2$  and  $E_s = 15 E_c$ ?

- A. 264 MN
- B. 274 MN
- C. 284 MN
- D. 294 MN

Ans. C.

Permissible stress in steel/permissible stress in concrete =  $E_s/E_c$ .

Permissible stress in steel =  $5 * 15E_c/E_c$   
=  $75 \text{ N/mm}^2$

Now,

$$P = 5 \times (200 \times 200 - 1200) + (1200 \times 75)$$

$$= 284000\text{N} = 284 \text{ kN}$$

55. A steel rod of sectional area 25 sq. mm connects two parallel walls 5 m apart. The nuts at the ends were tightened when the rod was heated at 100° C. If  $\alpha_{\text{steel}} = 0.000012/\text{C}^\circ$ ,  $E_{\text{steel}} = 0.2 \text{ MN/mm}^2$ , the tensile stress developed at a temperature of 50° C is \_\_\_\_\_.

- A. 80 N/mm<sup>2</sup>                      B. 100 N/mm<sup>2</sup>  
C. 120 N/mm<sup>2</sup>                      D. 150 N/mm<sup>2</sup>

Ans. C.

$\alpha_{\text{steel}} = 0.000012/\text{C}^\circ$ ,  $E_{\text{steel}} = 0.2 \text{ MN/mm}^2$ ,  
 $\Delta T = (100 - 50) = 50^\circ\text{C}$

now stress in rod =  $\alpha_{\text{steel}} \times \Delta T \times E_{\text{steel}} = 120 \text{ N/mm}^2$

56. The ratio of tangential and normal components of a stress on an inclined plane through  $\theta^\circ$  to the direction of the force is \_\_\_\_\_.

- A.  $\sin \theta$                               B.  $\cos \theta$   
C.  $\tan \theta$                               D.  $\cot \theta$

Ans. C.

Tangential stress =  $\sigma \sin \theta \cdot \cos \theta$

Normal stress =  $\sigma \cos^2 \theta$

Then their ratio =  $\tan \theta$

57. Pick up the correct statement from the following.

- A. For a uniformly distributed load, the shear force varies linearly  
B. For a uniformly distributed load, bending moment curve is a parabola  
C. For a load varying linearly, the shear force curve is a parabola  
D. All options are correct

Ans. D.

$dm/ds = \text{shear force}$ ,  $ds/dx = \text{loading}$ .

For a uniformly distributed load, the shear force varies linearly, For a uniformly distributed load, bending moment curve is a parabola, For a load varying linearly, the shear force curve is a parabola

58. At any point of a beam, the section modulus may be obtained by dividing the moment of inertia of the section by \_\_\_\_\_.

- A. depth of the section  
B. depth of the neutral axis  
C. maximum tensile stress at the section  
D. maximum compressive stress at the section

Ans. B.

At any point of a beam, the section modulus may be obtained by dividing the moment of inertia of the section by depth of the neutral axis.

$Z = \text{section modulus} = I/Y$ ,  $I = \text{moment of inertia}$ ,  $Y = \text{depth from neutral axis}$ .

59. The moment of inertia of a circular section about any diameter  $D$ , is \_\_\_\_\_.

- A.  $(\pi D^2)/64$                       B.  $(\pi D^4)/32$   
C.  $(\pi D^3)/64$                       D.  $(\pi D^4)/64$

Ans. D.

The moment of inertia of a circular section

about any diameter  $D$ , is  $(\pi D^4)/64$

60. In case of principal axes of a section \_\_\_\_\_.

- A. sum of moment of inertia is zero  
B. difference of moment of inertia is zero  
C. product of moment of inertia is zero  
D. None of these

Ans. C.

In case of principal axes of a section = 0

61. The locus of the moment of inertia about inclined axis to the principal axis is \_\_\_\_\_.

- A. straight line                      B. parabola  
C. circle                              D. ellipse

Ans. D.

The locus of the moment of inertia about inclined axis to the principal axis is ellipse.

62. The ratio of moments of inertia of a triangular section about its base and about a centroidal axis parallel to its base is \_\_\_\_\_.

- A. 1                                      B. 1.5  
C. 2                                      D. 3

Ans. D.

Moment of inertia of triangle about its base =  $bh^3/12$ ,

And about its centroidal axis =  $bh^3/36$

Then their ratio about base to centroidal axis = 3.

63. If aggregates completely pass through a sieve of size 75 mm and are retained on a sieve of size 60 mm, the particular aggregate will be flaky if its minimum dimension is less than \_\_\_\_\_.

- A. 20.5 mm                      B. 30.5 mm  
C. 40.5 mm                      D. 50.5 mm

Ans. C.

If aggregates completely pass through a sieve of size 75 mm and are retained on a sieve of size 60 mm, the particular aggregate will be flaky if its minimum dimension is less than 40.5 mm.



64. For the construction of thin R.C.C. structures the type of cement to be avoided is \_\_\_\_\_.

- A. ordinary Portland cement
- B. rapid hardening cement
- C. low heat cement
- D. blast furnace slag cement

Ans. D.

For the construction of thin R.C.C. structures the type of cement to be avoided is blast furnace slag cement, rate of gain of strength is quite low.

65. Percentage of pozzolanic material containing clay upto 80% used for the manufacture of pozzolana cement is \_\_\_\_\_.

- A. 30%
- B. 40%
- C. 50%
- D. 60%

Ans. A.

Percentage of pozzolanic material containing clay upto 80% used for the manufacture of pozzolana cement is 30%.

66. Pick up the incorrect statement applicable to the field test of good cement.

- A. When one thrusts one's hand into a bag of cement, one should feel warm
- B. The color of the cement is bluish
- C. A handful of cement thrown into a bucket of water should not sink immediately
- D. All options are incorrect

Ans. D.

When one thrusts one's hand into a bag of cement, one should feel cool.

The color of the cement is greyish colour.

A handful of cement thrown into a bucket of water should sink immediately.

67. Pick up the correct statement from the following.

- A. The maximum size of a coarse aggregate is 75 mm and minimum is 4.75 mm
- B. The maximum size of the fine aggregate is 4.75 mm and minimum 0.75 mm
- C. The material having particles of size varying from 0.06 mm to 0.002 mm is known as silt
- D. All options are correct

Ans. D.

The maximum size of a coarse aggregate is 75 mm and minimum is 4.75 mm, The maximum size of the fine aggregate is 4.75 mm and minimum 0.75 mm, The material having particles of size varying from 0.06 mm to 0.002 mm is known as silt.

68. Sand generally contains salt if it is obtained from \_\_\_\_\_.

- A. nala beds
- B. river beds
- C. sea beds
- D. All options are correct

Ans. C.

Sand generally contains salt if it is obtained from sea beds.

69. Pick up the correct statement from the following.

- A. Bulking of sand is caused due to formation of a thin film of surface moisture
- B. Fine sand bulks more than coarse sand
- C. With 10% moisture content by weight the bulking of sand is increased by 50%
- D. All options are correct

Ans. D.

Bulking of sand is caused due to formation of a thin film of surface moisture.

Fine sand bulks more than coarse sand.

70. If fineness modulus of sand is 2.5 it is graded as \_\_\_\_\_.

- A. very fine sand
- B. fine sand
- C. medium sand
- D. coarse sand

Ans. B.

If fineness modulus of sand is 2.5 it is graded as fine sand.

Fineness modulus 2.2 - 2.4 = very fine.

Fineness modulus 2.5 - 2.7 = fine

Fineness modulus 2.7 - 2.9 = medium

Fineness modulus 2.9 - 3.2 = coarse.

71. An ordinary Portland cement when tested for its fineness, should not leave any residue on I.S. Sieve No.9, more than \_\_\_\_\_.

- A. 5%
- B. 10%
- C. 15%
- D. 20%

Ans. B.

An ordinary Portland cement when tested for its fineness, should not leave any residue on I.S. Sieve No.9, more than 10%.

72. Pick up the correct statement from the following.

- A. Insufficient quantity of water makes the concrete mix harsh
- B. Insufficient quantity of water makes the concrete unworkable
- C. Excess quantity of water makes the concrete segregated
- D. All options are correct

Ans. D.

Insufficient quantity of water makes the concrete mix harsh, Insufficient quantity of water makes the concrete unworkable, Excess quantity of water makes the concrete segregated

73. Pick up the incorrect statement from the following.

- A. A rich mix of concrete possesses higher strength than that a lean mix of desired workability with excessive quantity of water
- B. The strength of concrete decreases as the water cement ratio increases
- C. If the water cement ratio is less than 0.45, the concrete is not workable and causes honey-combed structure
- D. Good compaction by mechanical vibrations, increases the strength of concrete

Ans. A.

A rich mix of concrete possesses higher strength than that a lean mix of desired workability with excessive quantity of water this wrong statement this leads to higher shrinkage and chances of segregation of concrete.

74. Pick up the correct statement from the following.

- A. The concrete gains strength due to hydration of cement
- B. The concrete cured at a temperature below  $23^{\circ}\text{C}$ , gains strength up to 28 days  $23^{\circ}\text{C}$
- C. The concrete does not set at freezing point
- D. All options are correct

Ans. D.

The concrete gains strength due to hydration of cement, The concrete cured at a temperature below  $23^{\circ}\text{C}$ , gains strength up to 28 days  $23^{\circ}\text{C}$ , The concrete does not set at freezing point.

75. Hardening of cement occurs at \_\_\_\_\_.

- A. rapid rate during the first few days and afterwards it continues to increase at a decreased rate
- B. slow rate during the first few days and afterwards it continues to increase at a rapid rate
- C. uniform rate throughout its age
- D. None of these

Ans. D.

Hardening of cement depends on the fineness of cement, quantity of gypsum, and bogus compounds.

76. Pick up the correct statement from the following.

- A. Higher workability indicates unexpected increase in the moisture content
- B. Higher workability indicates deficiency of sand
- C. If the concrete mix is dry, the slump is zero
- D. All options are correct

Ans. D.

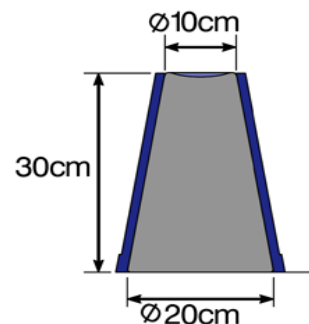
Higher workability indicates unexpected increase in the moisture content, Higher workability indicates deficiency of sand, If the concrete mix is dry, the slump is zero.

77. The top diameter, bottom diameter and the height of a slump mould are \_\_\_\_\_.

- A. 10 cm, 20 cm, 30 cm
- B. 10 cm, 30 cm, 20 cm
- C. 20 cm, 10 cm, 30 cm
- D. 20 cm, 30 cm, 10 cm

Ans. A.

The top diameter, bottom diameter and the height of a slump mould are 10 cm, 20 cm, 30 cm.



78. Pick up the correct statement from the following.

- A. Segregation is necessary for a workable concrete
- B. Consistency does not affect the workability of concrete
- C. If the slump increases, workability decreases
- D. None of these

Ans. D.

Segregation cause ill effect on the strength of concrete.

Consistency much more affect workability for a good workable mixture need 0.78p consistency.

As slump increase the workability also increases.

79. The grade of concrete M 150 means that compressive strength of a 15 cm cube after 28 days, is \_\_\_\_\_.

- A. 100 kg/cm<sup>2</sup>
- B. 150 kg/cm<sup>2</sup>
- C. 200 kg/cm<sup>2</sup>
- D. 250 kg/cm<sup>2</sup>

Ans. B.

As per IS 456:2000

The grade of concrete M 150 means that compressive strength of a 15 cm cube after 28 days, is 150 kg/cm<sup>2</sup>

80. The preliminary test is repeated if the difference compressive strength of three test specimens, exceeds \_\_\_\_\_.

- A. 5 kg/cm<sup>2</sup>
- B. 8 kg/cm<sup>2</sup>
- C. 10 kg/cm<sup>2</sup>
- D. 15 kg/cm<sup>2</sup>

Ans. D.

The preliminary test is repeated if the difference compressive strength of three test specimens, exceeds 15 kg/cm<sup>2</sup>.

81. According to load factor method, the permissible load W on a short column reinforced with longitudinal bars and lateral stirrups is \_\_\_\_\_.

- A. Stress in concrete x area of concrete
- B. Stress in steel x area of steel
- C. Stress in concrete x area of concrete + stress in steel x area of steel
- D. None of these

Ans. C.

According to load factor method, the permissible load W on a short column reinforced with longitudinal bars and lateral stirrups is Stress in concrete x area of concrete + stress in steel x area of steel  
And for long column suitable reduction factor is used as  $C_r = 1.25 - (L_{eff}/48B)$

82. The length of the lap in a compression member is kept greater than [bar diameter x (Permissible stress in bar)/(Five times the bond stress)] or is \_\_\_\_\_.

- A. 12 bar diameters
- B. 18 bar diameters
- C. 24 bar diameters
- D. 30 bar diameters

Ans. C.

As per IS 456:2000

The length of the lap in a compression member is kept greater than [bar diameter x (Permissible stress in bar)/(Five times the bond stress)] or is 24 bar diameters.

83. 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<sup>2</sup> and 300 kg/cm<sup>2</sup>, the safe load on the column should not exceed \_\_\_\_\_.

- A. 412 kg
- B. 4120 kg
- C. 412000 kg
- D. None of these

Ans. D.

Permissible load on short column = Stress in concrete x area of concrete + stress in steel x area of steel

$$W = 40 \times (20 \times 20 - 20) + 20 \times 300 = 21200 \text{ kg.}$$

84. A column is regarded as long column if the ratio of its effective length and lateral dimension exceeds \_\_\_\_\_.

- A. 10
- B. 15
- C. 20
- D. None of these

Ans. D.

A column is regarded as long column if the ratio of its effective length and lateral dimension exceeds 12.

85. If the size of a column is reduced above the floor, the main bars of the columns \_\_\_\_\_.

- A. continues up
- B. bend inwards at the floor level
- C. stops just below the floor level and separates lap bars provided
- D. All options are correct

Ans. D.

If the size of a column is reduced above the floor, the main bars of the columns, continues up, bend inwards at the floor level, stops just below the floor level and separates lap bars provided.

86. The pitch of the main bars in a simply supported slab should not exceed its effective depth by \_\_\_\_\_.

- A. three times
- B. four times
- C. five times
- D. six times

Ans. D.

As per IS 456:2000

The pitch of the main bars in a simply supported slab should not exceed its effective depth by six times.

87. Distribution reinforcement in a simply supported slab is provided to distribute \_\_\_\_\_.

- A. load
- B. temperature stress
- C. shrinkage stress
- D. All options are correct

Ans. D.

Distribution reinforcement in a simply supported slab is provided to distribute load, temperature stress, shrinkage stress.

88. In a simply supported slab the minimum spacing of distribution reinforcement should be four times the effective thickness of the slab or \_\_\_\_\_.

- A. 20 cm
- B. 30 cm
- C. 40 cm
- D. None of these

Ans. D.

As per IS 456:2000

In a simply supported slab the minimum spacing of distribution reinforcement should be four times the effective thickness of the slab or 5 mm.

89. The modular ratio 'm' of a concrete whose permissible compressive stress is 'C' may be obtained from the equation \_\_\_\_\_.

- A.  $m = 700/3C$
- B.  $m = 1400/3C$
- C.  $m = 2800/3C$
- D.  $m = 3500/3C$

Ans. C.

The modular ratio 'm' of a concrete whose permissible compressive stress is 'C' may be obtained from the equation  $m=280/3C$ .

90. For M 150 grade concrete (1 : 2 : 4) the moment of resistance factor is \_\_\_\_\_.

- A. 0.87
- B. 8.5
- C. 7.5
- D. 5.8

Ans. B.

For M 150 grade concrete (1 : 2 : 4) the moment of resistance factor is 8.5.

91. If the thickness of a structural member is small as compared to its length and width, it is classified as \_\_\_\_\_.

- A. one dimensional
- B. two dimensional
- C. three dimensional
- D. None of these

Ans. B.

If the thickness of a structural member is small as compared to its length and width, it is classified as two dimensional structure.

92. Design of a riveted joint assumes that \_\_\_\_\_.

- A. the bending stress in rivets is accounted for
- B. the riveted hole is to be filled by the rivet
- C. the stress in the plate is not uniform
- D. the friction between plates is considered

Ans. B.

Design of a riveted joint assumes that the riveted hole is to be filled by the rivet.

93. Rolled steel T-sections are used \_\_\_\_\_.

- A. as columns
- B. with flat strips to connect plates in steel rectangular tanks
- C. as built up sections to resist axial tension
- D. None of these

Ans. B.

Rolled steel T-sections are used with flat strips to connect plates in steel rectangular tanks. Flanges in T-beam increases the moment carrying capacity of tank.

94. With a percentage increase of carbon in steel, decreases its \_\_\_\_\_.

- A. strength
- B. hardness
- C. brittleness
- D. ductility

Ans. D.

With a percentage increase of carbon in steel, decreases its ductility, steel become more brittle. Carbon content in steel the major deciding factor towards ductility.

95. If  $P$  is the wind pressure in  $\text{kg/cm}^2$ ,  $v$  is the velocity in  $\text{km/hour}$  and  $K$  is constant of proportionality then \_\_\_\_\_.

- A.  $P=K/v^2$
- B.  $v=K/P^2$
- C.  $P=Kv^2$
- D.  $P=Kv$

Ans. C.

If  $P$  is the wind pressure in  $\text{kg/cm}^2$ ,  $v$  is the velocity in  $\text{km/hour}$  and  $K$  is constant of proportionality then  $P=Kv^2$

96. Factor of safety is the ratio of \_\_\_\_\_.

- A. yield stress to working stress
- B. tensile stress to working stress
- C. compressive stress to working stress
- D. bearing stress to working stress

Ans. A.

Factor of safety is the ratio of yield stress to working stress.

97. The ratio of shearing stress to shearing strain within elastic limit, is known as \_\_\_\_\_.

- A. modulus of elasticity
- B. shear modulus of elasticity
- C. bulk modulus of elasticity
- D. tangent modulus of elasticity

Ans. B.

Modulus of rigidity is defined as The ratio of shearing stress to shearing strain within elastic limit.

98. The rivets which are heated and then driven in the field are known \_\_\_\_\_.

- A. power driven shop rivets
- B. power driven field rivets
- C. hand driven rivets
- D. cold driven rivets

Ans. B.

The rivets which are heated and then driven in the field are known power driven field rivets.

99. The gross diameter of a rivet is the diameter of \_\_\_\_\_.

- A. cold rivet before driving
- B. rivet after driving
- C. rivet hole
- D. None of these

Ans. B.

The gross diameter of a rivet is the diameter of rivet after driving.

Gross dia or nominal dia. is taken shank dia. + 1.5 , up 25 mm shank dia. And >25 add 2 in place of 1.5 .

100. Working shear stress on the gross area of a rivet as recommended by Indian Standards is \_\_\_\_\_.

- A.  $785 \text{ kg/cm}^2$
- B.  $1025 \text{ kg/cm}^2$
- C.  $2360 \text{ kg/cm}^2$
- D. None of the these

Ans. B.

Working shear stress on the gross area of a rivet as recommended by Indian Standards is  $1025 \text{ kg/cm}^2$

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