

<p><b>ENGINEERING ACADEMY</b></p>	<p align="center">Class Centre-Pithuwala   Karanpur; HO: Shimla bypass road near Government polytechnic Pithuwala Dehradun Mob:08449597123,09411340612 Web: www.engineeringacademy.co.in E-mail:engineeringacademyddn@gmail.com</p>
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1. Chemically, marble is known as

- a) Metamorphic rock
- b) Argillaceous rock
- c) Calcareous rock
- d) Siliceous rock

ans-(a)

2. The standard size of a masonry brick is

- a) 18 x 8 x 8 cm
- b) 19 x 9 x 9 cm
- c) 20 x 10 x 10 cm
- d) 21 x 11 x 11 cm

ans-(b)

3. Generally wooden moulds are made from

- a) Plywood
- b) Shisham wood
- c) Deodar wood
- d) Teak wood

ans-(d)

4. Good quality sand is never obtained from

- a) River
- b) Nala
- c) Sea
- d) Gravel powder

ans-(c)

5. Plywood is made from

- a) Common timber
- b) Bamboo fibre
- c) Teak wood only
- d) Asbestos sheets

ans-(a)

6. The most commonly used base for timber painting is

- a) Red lead
- b) Zinc White
- c) White lead
- d) Titanium white

ans-(c)

7. Plastic asphalt is

- a) Used as a waterproofing layer over roof
- b) A mixture of cement and asphalt
- c) A natural asphalt
- d) A refinery product

ans-(b)

8. The most durable varnish is

- a) Water varnish
- b) Spirit varnish
- c) Turpentine varnish
- d) Oil varnish

ans-(d)

9. Bitumen is generally obtained from

- a) Organic material
- b) Synthetic material
- c) Petroleum product
- d) Coal

ans-(c)

10. Snowcrete is one of the patent forms of

- a) Distempers
- b) Water proof cement paints
- c) Enamel paints
- d) Cellulose paints

ans-(b)

11. The limiting length of an offset does not depend upon

- a) Accuracy of the work
- b) Method of setting out perpendiculars
- c) Scale of plotting
- d) Indefinite features to be surveyed

ans-(d)

12. The construction of optical squares is based on the principal of optical

- a) Reflection
- b) Refraction
- c) Double refraction
- d) Double reflection

ans-(d)

13. In an adjusted level, when the bubble is centered, 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 these

ans-(b)

14. The line normal to the plumb line is known as

- a) Horizontal line
- b) Level line

- c) Datum line  
d) Vertical line

ans-(a)

15. The best method of interpolation of contours is by

- a) Estimation      b) Graphical means  
c) Computation    d) All of these

ans-(d)

16. Plotting of inaccessible points on a plane table is done by

- a) Intersection      b) Traversing  
c) Radiation          d) None of these

ans-(d)

17. Uniformity coefficient of well graded soil is

- a) Less than 2      b) Greater than 2  
c) Greater than 6    d) None of these

ans-(c)

18. The moisture content of a soil below which the soil volume becomes constant is called the

- a) Liquid limit      b) Plastic limit  
c) Shrinkage limit    d) All of these

ans-(c)

19. A sample of saturated clay has a porosity of 0.562. The void ratio of the clay is

- a) 1.283              b) 0.438  
c) 1.779              d) 0.360

ans-(a)

20. Coefficient of permeability of soil varies approximately as

- a)  $D^2_{10}$               b)  $\sqrt{D_{10}}$   
c)  $D^3_{10}$               d)  $D^{3/2}_{10}$

ans-(a)

21. For a granular soil, with increasing void ratio, the critical hydraulic gradient

- a) Decreases          b) Increases  
c) Remains constant    d) Is zero

ans-(a)

22. For cohesive soils, with increasing compactive effort, the optimum moisture content

- a) Increases              b) Decreases  
c) Remains constant    d) Is zero

ans-(b)

23. For routine consolidation test in laboratory, the thickness of the specimen is

- a) 10mm                b) 20mm  
c) 40mm                d) 60mm

ans-(b)

24. A footing is resting on a fully saturated clayey strata. For checking the initial stability, shear parameters are used from

- a) Consolidated undrained test  
b) Unconsolidated drained test  
c) Unconsolidated undrained test  
d) Unconsolidated undrained test with pore pressure measurement

ans-(c)

25. Coefficient of active earth pressure for cohesionless soils is given by:

- a)  $\frac{1 + \sin \phi}{1 - \sin \phi}$               b)  $\frac{1 - \sin \phi}{1 + \sin \phi}$   
c)  $\frac{1 + \tan \phi}{1 - \tan \phi}$               d)  $\frac{1 + \cos \phi}{1 - \cos \phi}$

ans- (b)

26. The grouping of piles will not reduce the load carrying capacity in case of

- a) Friction piles              b) End bearing piles  
c) Both (a) and (b)          d) None of the above

ans- (c)

27. Poise is the unit of

- a) Mass density              b) Kinematic viscosity  
c) Viscosity                  d) Velocity gradient

ans- (c)

28. Gauge pressure at a point is equal to

- a) Absolute pressure plus atmospheric pressure  
b) Absolute pressure minus atmospheric pressure

c) Vacuum pressure plus absolute pressure

c) Colour

d) Bacteria

d) None of these

ans- (d)

ans- (b)

29. The loss of pressure head for the laminar flow through pipe varies

35. The ratio of discharge and plan area of a continuous flow type settling tank, is known as

a) As the square of velocity

a) Surface loading

b) Overflow

b) Directly as the velocity

c) Overflow rate

d) All of the above

c) As the inverse of velocity

ans- (a)

d) None of the above

36. Permanent hardness of water can be removed by

ans- (a)

a) Adding alum

b) Adding lime

30. The difference in pressure head, measured by a mercury water differential manometer for a 20cm difference of mercury level, will be

c) Adding chlorine

d) Zeolite process

a) 2.72 m

b) 2.52m

ans- (d)

c) 2.0m

d) 0.2m

37. The minimum diameter of an opening of a manhole should be

a) 25cm

b) 50cm

ans- (a)

c) 75 cm

d) 100cm

31. The flow in open channel is laminar if the Reynolds number is

ans-(b)

a) 2000

b) More than 2000

38. For providing an Indian Type W.C the R.C.C slabs in the toilet portion

c) More than 4000

d) Less than 500

a) Should be sunk by 20cm

ans- (d)

b) Should be kept 20 cm above the adjacent portion

32. The net head (H) on the turbine is given by

a)  $H = \text{Gross Head} + \text{Head lost due to friction}$

c) Should be sunk by 50cm

b)  $H = \text{Gross Head} - \text{Head lost due to friction}$

d) Need not be sunk

c)  $H = \text{Gross Head} + \frac{V^2}{2g} - \text{Head lost due to friction}$

ans- (b)

d) None of the above

39. Every material obeys Hooke's law within its

ans-(c)

a) Elastic limit

b) Plastic limit

c) Limit of proportionality

33. Water supplies includes

d) None of the above

a) Collection, Transportation and treatment of water

ans- (a)

b) Distribution of water to consumers

40. If a uniform bar is supported at one end in a vertical direction and loaded at the bottom end by a load equal to the weight of the bar, the strain energy as compared to that due to self weight will be

c) Provision of hydrants for fire fighting

a) Same

b) Half

d) All of the above

c) Twice

d) Thrice

ans- (d)

34. Disinfection of drinking water is done to remove

ans-(c)

a) Turbidity

b) Odour

**JUNIOR ENGINEERING**

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41. A cantilever of span 'l' has a load P acting at the free end. The bending moment at the free end will be

- a) 0  
c) -Pl
- b) Pl  
d) Pl/2

ans-(a)

42. The bending moment (M) is constant over a length segment (l) of a beam. The shearing force will also be constant over this length and is given by

- a)  $\frac{M}{l}$   
c)  $\frac{M}{4l}$
- b)  $\frac{M}{2l}$   
d) None of these

ans-(d)

43. Consider the following statements:

A simply supported beam is subjected to a couple somewhere in the span. It would produce

1. a rectangular SF diagram
2. parabolic BM diagrams
3. both +ve and -ve BMs which are maximum at the point of application of the couple

Of these statements

- a) 1, 2 and 3 are correct  
b) 1 and 2 are correct  
c) 2 and 3 are correct  
d) 1 and 3 are correct

ans-(d)

44. A beam simply supported at both the ends, of length 'l' carries two equal unlike couples 'M' at two ends. If the flexural rigidity EI is constant then the central deflection of beam is given by

- a)  $\frac{Ml^2}{4EI}$   
c)  $\frac{Ml^2}{64EI}$
- b)  $\frac{Ml^2}{16EI}$   
d)  $\frac{Ml^2}{8EI}$

ans-(d)

45. For a given material, if E, N and  $\frac{1}{m}$  are Young's Modulus, Modulus of Rigidity and Poisson's Ratio, then

- a)  $E=2N\left(1+\frac{1}{m}\right)$   
c)  $E=\frac{2N}{\left(1+\frac{1}{m}\right)}$
- b)  $E=2N\left(1-\frac{1}{m}\right)$   
d)  $E=\frac{1}{2N\left(1+\frac{1}{m}\right)}$

ans-(a)

46. Euler's crippling load for a column of length L with one end fixed and the other hinged is

- a)  $\frac{\pi^2 EI}{L^2}$   
c)  $\frac{\pi^2 EI}{4L^2}$
- b)  $\frac{4\pi^2 EI}{L^2}$   
d)  $\frac{2\pi^2 EI}{L^2}$

ans-(d)

47. A circular shaft can transmit a torque of 5kNm. If the torque is reduced to 4kNm, then the maximum value of bending moment that can be applied to the shaft is

- a) 1kNm  
c) 3kNm
- b) 2kNm  
d) 4kNm

ans-(d)

48. A closed coil helical spring is subjected to a torque about its axis. The spring wire would experience a

- a) Bending stress  
b) Direct tensile stress of uniform intensity at its cross section  
c) Direct shear stress  
d) Torsional shearing stress

ans-(a)

49. The strength and quality of concrete depend upon

- a) Grading of the aggregates  
b) Surface area of the aggregates  
c) Surface texture of the aggregates  
d) All of the above

ans-(d)

50. The concrete having a slump of 6.5cm is said to be

- a) Dry                      b) Earth moist  
c) Semi-plastic        d) Plastic

ans-(d)

51. Separation of water or water sand cement from a freshly mixed concrete is known as

- a) Bleeding              b) Creeping  
c) Segregation        d) Flooding

ans-(a)

52. Los Angeles machine is used to test the aggregate for

- a) Crushing strength    b) Impact value  
c) Abrasion resistance   d) Water absorption

ans-(c)

53. Water cement ratio is generally expressed in volume of water required per

- a) 10kg cement        b) 20 kg cement  
c) 50 kg cement        d) 40 kg cement

ans- (c)

54. I.S.I has specified the full strength of concrete after

- a) 7 days                b) 14 days  
c) 21 days              d) 28 days

ans- (d)

55. The concrete mix which causes difficulty in obtaining a smooth finish is known to possess

- a) Segregation        b) Internal friction  
c) Hardness            d) Bleeding

ans-(d)

56. A flaky aggregate is said to be elongated if its length is

- a) Equal to its mean size  
b) Twice the mean size  
c) Thrice the mean size  
d) Four times the mean size

ans-(b)

57. Permissible compressive strength of M 200 concrete grade is

- a) 100kg/cm<sup>2</sup>            b) 150kg/cm<sup>2</sup>  
c) 200 kg/cm<sup>2</sup>        d) 250 kg/cm<sup>2</sup>

ans-(c)

58. The shrinkage of concrete is

- a) Proportional to water content in the mix  
b) Proportional to cement concrete  
c) Increases with age of concrete  
d) All of the above

ans-(d)

59. The length of the straight portion of the bar beyond the end of the hook should be atleast

- a) Twice the diameter  
b) Thrice the diameter  
c) Four times the diameter  
d) Seven times the diameter

ans-(c)

60. Minimum spacing between horizontal parallel reinforcement of different sizes should not be less than

- a) One diameter of thinner bar  
b) One diameter of thicker bar  
c) Sum of the diameter of thinner and thicker bars  
d) Twice the diameter of thinner bar

ans-(b)

61. Columns may be made of plain concrete if their unsupported length does not exceed their least lateral dimension by

- a) two times            b) Three times  
c) Four times        d) Five times

ans-(b)

62. If d and n are the effective depth and depth of the neutral axis respectively of a singly reinforced beam, the lever arm of the beam is

- a) d                      b) n  
c)  $d + \frac{n}{3}$                 d)  $d - \frac{n}{3}$

ans-(d)

63. The effective span of a simply supported slab is

- a) Distance between the centres of the bearings
- b) Clear distance between the inner faces of the wall plus twice the thickness of the wall
- c) Clear span plus effective depth of the slab
- d) None of these

ans-(c)

64. For a continuous floor slab supported on beams, the ratio of end span length and intermediate span length is

- a) 0.6                      b) 0.7
- c) 0.8                      d) 0.9

ans-(d)

65. The effective width of a column strip of a flat slab is

- a) One – fourth the width of the panel
- b) Half the width of the panel
- c) Radius of the column
- d) Diameter of the column

ans-(a)

66. For a number of columns constructed in a row, the type of foundation provided is

- a) Footing                      b) Raft
- c) Strap                        d) Strip

ans-(d)

67. According to IS: 456-1978, the thickness reinforced concrete footing on piles at its edges is kept less than

- a) 5 cm                      b) 10 cm
- c) 15 cm                      d) 20 cm

ans-(d)

68. Net cross sectional area of a tension member is equal to its gross section area

- a) Plus the area of rivet holes
- b) Divided by the area of rivet holes
- c) Multiplied by the area of rivet holes
- d) Minus the area of rivet holes

ans-(d)

69. A tension member, if subjected to possible reversal of stress due to wind, the slenderness ratio of the member should not exceed

- a) 180                        b) 200
- c) 250                        d) 350

ans-(a)

70. A beam is defined as a structural member subjected to

- a) Axial loading
- b) Transverse loading
- c) Axial and transverse loading
- d) None of these

ans-(b)

71. To calculate the area of cover plates of a built up beam, an allowance for rivet holes to be added is

- a) 10%                        b) 13%
- c) 15%                        d) 18%

ans-(b)

72. A web plate is called unstiffened if the ratio of clear depth and thickness is less than

- a) 35                        b) 50
- c) 60                        d) 85

ans-(b)

73. According to IS: 800-1962 the permissible bending stress in steel slab plates is

- a) 1500kg/cm<sup>2</sup>                      b) 1420 kg/cm<sup>2</sup>
- c) 2125 kg/cm<sup>2</sup>                      d) 1890 kg/cm<sup>2</sup>

ans-(a)

74. The method of design of steel framework for greatest rigidity and economy in weight is known as

- a) Simple design                      b) Semi-rigid design
- c) Fully rigid design                      d) None of these

ans-(c)

75. The enlarged head of the supporting column of a flat slab is called :

- a) Capital                      b) Drop
- c) Panel                        d) Block

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Ans-(a)

a) 1 and 4

b) 3 and 4

c) 1 and 2

d) 2 and 3

76. Spalling stresses are produced in post-tensioned pre-stressed concrete members at

Ans-(c)

a) locations of maximum bending moment only

81. A circular shaft of diameter D is subjected to a torque T. The maximum shear stress of the shaft will be

b) locations of maximum shear zone

a) proportional to  $D^3$

c) anchorage zone

b) proportional to  $D^4$

d) bond-developing zone

c) inversely proportional to  $D^3$

ans-(a)

d) inversely proportional to  $D^4$

77. In a pre-stressed member, it is advisable to use

ans-(c)

a) low-strength concrete

82. The best suited rolled steel section for a tension member is

b) high-strength concrete

a) Angle section

b) T-section

c) high strength concrete and high-tension steel

c) Channel section

d) Flat section

d) high strength concrete and low-tension steel

ans-(b)

ans-(c)

78. In PERT analysis, the time estimates of activities follow

83. In a plate girder, the web is primarily designed to resist

a) Normal distribution curve

a) Torsional moment

b) Shear force

b)  $\beta$ -distribution curve

c) Bending moment

d) Diagonal buckling

c) Poisson's distribution curve

ans-(b)

d) Binomial distribution curve

84. Lacing of compound steel columns

a) Increases the load-carrying capacity

b) Decreases the chances of local buckling

ans-(b)

c) Decreases overall buckling of the column

79. Which compound of cement is responsible for strength of cement?

d) Assures unified behaviour

a) Magnesium oxide

Ans-(b)

b) Silica

85. Horizontal stiffener in a plate girder is provided to safeguard against web buckling due to

c) Alumina

a) Shear

d) Calcium sulphate

b) Compressive force in bending

c) Tensile force in bending

ans-(b)

d) Heavy concentrated load

80. Which of the following ingredients refer to binding materials of mortar?

1. Cement

2. Lime

3. Sand

4. Ashes

Select the correct answer using the code given below.

86. In an industrial steel building, which of the following elements of a pitched roof primarily resist loads parallel to the ridge?

- a) Bracings            b) Purlins
- c) Columns            d) Trusses

ans-(a)

87. For a compression member with double angle section, which of the following sections will give larger value of minimum radius of gyration?

- a) Equal angles back to back
- b) Unequal angles with long legs back to back
- c) Unequal angles with short legs back to back
- d) None of the above

ans-(b)

88. According to IS: 875 Part 3, design wind speed is obtained by multiplying the basic wind speed by factors  $k_1$ ,  $k_2$  and  $k_3$ , where  $k_3$  is

- a) Terrain height factor
- b) Structure size factor
- c) Topography factor
- d) Risk coefficient

ans-(c)

89. The serviceability criterion for a plate girder design is based upon

- a) Width of flange
- b) Depth of web
- c) Minimum thickness of web
- d) Stiffness of web

ans-(c)

90. If any tension reinforcement in an RC beam attains its yield stress during loading before the concrete in the compression zone fails due to crushing, the beam is said to be

- a) Under-reinforced
- b) Over-reinforcement
- c) Balanced

d) Non-homogeneous

ans-(a)

91. The distance between the centroid of the area of tension reinforcement and the maximum compressive fibre in a reinforced concrete beam design is known as

- a) Overall depth
- b) Effective depth
- c) Lever arm
- d) Depth of neutral axis

ans-(b)

92. The symmetry of the stress tensor at a point in a body when at equilibrium is obtained from

- a) Conservation of mass
- b) Force equilibrium equations
- c) Moment equilibrium equations
- d) Conservation of energy

ans-(c)

93. A hinged support in a real beam

- a) Becomes an internal hinge in a conjugate beam
- b) Changes to a free support in a conjugate beam
- c) Changes to a fixed support in a conjugate beam
- d) Remains as a hinged support in a conjugate beam

beam

beam

ans-(d)

94. Force method in a structural analysis always

- Ensures
- a) Compatibility of deformation
- b) Equilibrium of forces
- c) Kinematic admissible strains
- d) Overall safety

ans-(a)



95. The Muller-Breslau principle for influence line is applicable for

- a) Simple beams
- b) Continuous beams
- c) Redundant trusses
- d) All of the above

ans-(d)

100. Cross hairs in surveying telescopes, are fitted:

- a) In the objective lens
- b) At the centre of the telescope
- c) At the optical centre of the eyepiece
- d) In front of the eyepiece

ans-(d)

96. The effective length of a fillet weld is taken

as the actual length

- a) plus twice the size of weld
- b) minus twice the size of weld
- c) plus the size of weld
- d) minus the size of weld

ans-(b)

97. Which of the following tests compares the dynamic modulus of elasticity of samples of concrete ?

- a) Compression test
- b) Ultrasonic pulse velocity test
- c) Split test
- d) Tension test

ans-(b)

98. Which one of the following states falls under the "Limit state of Serviceability" as per IS-456?

- a) Stability under load
- b) Loss of equilibrium of a structure
- c) Floor vibration
- d) Formation of mechanism

ans-(c)

99. Factor of safety is the ratio of

- a) Tensile stress to working stress
- b) Compressive stress to working stress
- c) Bending stress to working stress
- d) Yield stress to working stress

ans-(d)