

1. In a mortar, the binding material is

- A.** cement
- B.** sand
- C.** surkhi
- D.** cinder.

2. Ultimate strength to cement is provided by

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

3. Bitumen felt

- A.** is used as water proofing material
- B.** is used as damp proofing material
- C.** is made from bitumen and hessian fibres
- D.** all the above.

4. The initial setting time of lime-pozzolana, is

- A.** 30 minutes
- B.** 60 minutes
- C.** 90 minutes
- D.** 120 minutes.

5. Sand stone is

- A.** sedimentary rock
- B.** metamorphic rock
- C.** igneous rock
- D.** Volcanic rock.

6. Due to attack of dry rot, the timber

- A.** Cracks
- B.** Shrinks
- C.** reduces to powder
- D.** None of these.

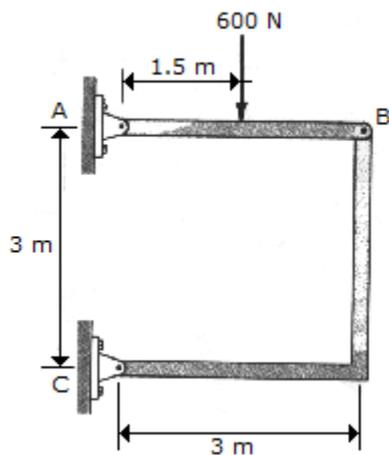
7. Determine the horizontal and vertical components of force at pins *A* and *C* of the two-member frame.

- A.** $A_x = -212 \text{ N}$, $A_y = 388 \text{ N}$, $C_x = 212 \text{ N}$, $C_y = 212 \text{ N}$

B. $A_x = -300 \text{ N}$, $A_y = 300 \text{ N}$, $C_x = 300 \text{ N}$, $C_y = 300 \text{ N}$

C. $A_x = -849 \text{ N}$, $A_y = 149 \text{ N}$, $C_x = 849 \text{ N}$, $C_y = 849 \text{ N}$

D. $A_x = -1200 \text{ N}$, $A_y = 1200 \text{ N}$, $C_x = 1200 \text{ N}$, $C_y = -600 \text{ N}$



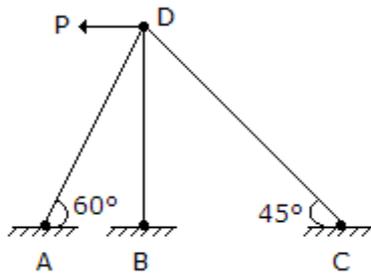
8. The degree of indeterminacy of the frame in the given figure, is

A. zero

B. 1

C. 2

D. 3



9. The equivalent length of a column of length L having one end fixed and the other end free, is

A. $2L$

B. L

C. $\frac{L}{2}$

D. $\frac{L}{\sqrt{2}}$

10. The radius of gyration of a rectangular section (depth D , width B) from a centroidal axis

parallel to the width is

A. $\frac{D}{2}$

B. $\frac{D}{\sqrt{3}}$

C. $\frac{D}{2\sqrt{3}}$

D. $\frac{D}{4\sqrt{3}}$

11. The moment of inertia of a circular section about any diameter D , is

A. $\frac{\pi D^2}{64}$

B. $\frac{\pi D^4}{32}$

C. $\frac{\pi D^3}{64}$

D. $\frac{\pi D^4}{64}$

12. A simply supported beam A carries a point load at its midspan. An other identical beam B carries the same load but uniformly distributed over the entire span. The ratio of the maximum deflections of the beams A and B , will be

A. $\frac{2}{3}$

B. $\frac{3}{2}$

C. $\frac{5}{8}$

D. $\frac{8}{5}$

13. m_1 and m_2 are the members of two individual simple trusses of a compound truss. The compound truss will be rigid and determinate if

A. $m = m_1 + m_2$

B. $m = m_1 + m_2 + 1$

C. $m = m_1 + m_2 + 2$

D. $m = m_1 + m_2 + 3$

14. One litre of water occupies a volume of

A. 100 cm^3

B. 250 cm³

C. 500 cm³

D. 1000 cm³

15. The value of bulk modulus of a fluid is required to determine

A. Reynold's number

B. Froude's number

C. Mach number

D. Euler's number

16. The kinematic viscosity is the

A. ratio of absolute viscosity to the density of the liquid

B. ratio of density of the liquid to the absolute viscosity

C. product of absolute viscosity and density of the liquid

D. product of absolute viscosity and mass of the liquid

17. The Reynold's number of a ship is _____ to its velocity and length.

A. directly proportional

B. inversely proportional

18. The discharge through a siphon spillway is

A. $C_d \times a \sqrt{2gH}$

B. $C_d \times a \sqrt{2g} \times H^{3/2}$

C. $C_d \times a \sqrt{2g} \times H^2$

D. $C_d \times a \sqrt{2g} \times H^{5/2}$

19. Hydrographic surveys deal with the mapping of

A. large water bodies

B. heavenly bodies

C. mountaineous region

D. canal system

E. movement of clouds.

20. An ideal vertical curve to join two gradients, is

A. Circular

- B.** Parabolic
- C.** Elliptical
- D.** Hyperbolic
- E.** none of these

21.If S is the length of a subchord and R is the radius of simple curve, the angle of deflection between its tangent and sub-chord, in minutes, is equal to

- A.** $573 S/R$
- B.** $573 R/S$
- C.** $171.9 S/R$
- D.** $1718.9 R/S$
- E.** $1718.9 S/R$.

22.Pick up the correct statement from the following :

- A.** the tangent screw enables to give small movement under conditions of smooth and positive control
- B.** standing on the tripod is the levelling head or trib arch
- C.** the levelling screws are used to tilt the instrument so that its rotation axis is truly vertical
- D.** all the above.

23.Closed contours of decreasing values towards their centre, represent

- A.** a hill
- B.** a depression
- C.** a saddle or pass
- D.** a river bed.

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

- A.** simply design
- B.** semi-rigid design
- C.** fully rigid design
- D.** none of these.

25.If the pitch is 6 cm and rivet value is 4 tonnes, the number of rivets required for a riveted connection carrying an eccentric load of 15 tonnes at a distance of 30 cm from the centre line, is

- A.** 6
- B.** 8
- C.** 10

D. 12

E. 15

26. In plastic analysis, the shape factor for circular sections, is

A. 1.5

B. 1.6

C. 1.697

D. none of these.

27. According to IS : 800 - 71, the minimum thickness of a vertically stiffened web plate, shall not be less than

A. $\frac{d}{85}$

B. $\frac{d}{200}$

C. $\frac{d}{225}$

D. $\frac{d}{250}$

E. none of these.

28. A structural member subjected to compressive stress in a direction parallel to its longitudinal axis, is generally known as

A. column

B. stanchion

C. post

D. strut

E. all the above.

29. The most economical section for a column, is

A. rectangular

B. solid round

C. flat strip

D. tubular section

E. hexagonal.

30. The maximum area of tension reinforcement in beams shall not exceed

A. 0.15%

B. 1.5%

C. 4%

D. 1%

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

- A. rectangular columns is 4
- B. circular columns is 6
- C. octagonal columns is 8
- D. all the above.

32. Cantilever retaining walls can safely be used for a height not more than

- A. 3 m
- B. 4 m
- C. 5 m
- D. 6 m
- E. 8 m

33. 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 walls plus twice the thickness of the wall
- C. clear span plus effective depth of the slab
- D. none of these.

34. If the permissible compressive stress for a concrete in bending is $C \text{ kg/m}^2$, the modular ratio is

- A. $2800/C$
- B. $2300/2C$
- C. $2800/3C$
- D. $2800/C^2$

35. In a liquid limit test, the moisture content at 10 blows was 70% and that at 100 blows was 20%. The liquid limit of the soil, is

- A. 35%
- B. 50%
- C. 65%
- D. none of these.

36. The active earth pressure of a soil is proportional to (where ϕ is the angle of friction of the soil)

- A. $\tan(45^\circ - \phi)$
- B. $\tan^2(45^\circ + \phi/2)$
- C. $\tan^2(45^\circ - \phi/2)$

D. $\tan(45^\circ + \phi)$

37. Which one of the following statements is true ?

A. Clays are more porous than sands

B. Pressure of organic matter in a soil decreases the bearing capacity of the soil

C. Aluminous cement is used for foundations in soils with chemical deposits

D. All the above.

38. The lateral earth pressure on a retaining wall

A. is equal to mass of the soil retained

B. proportional to the depth of the soil

C. proportional to the square of the depth of the soil

D. proportional to the internal friction of the soil

E. none of these.

39. The maximum value of effective stress in the past divided by the present value, is defined as over consolidation ratio (OCR). The O.C.R. of an over consolidated clay is

A. less than 1

B. 1

C. more than 1

D. None of these.

40. Under-reamed piles are generally

A. driven piles

B. bored piles

C. precast piles

D. all the above.

41. Suspended solid present in the waste water generated in blast furnace gas cooling and cleaning plant is removed by

A. biological oxygen pond.

B. radial settling tank (thickener) using coagulant (lime & ferrous sulphate).

C. lagoons.

D. filtration.

42. Maximum allowable concentration of CO_2 in air for safe working is _____ ppm (parts per million).

A. 50

B. 1000

C. 2000

D. 5000

43. Tolerable limit of nitrogen oxides in air is _____ ppm.

A. 0.1

B. 1

C. 5

D. 25

44. Which of the following is the common pollutant emitted from metallurgical smelters, thermal power plant and cement plants ?

A. NO_x

B. Hg

C. SO₂

D. F

45. Which is the best and the most effective method for the removal of organic contaminant present in the polluted water in very small quantity (say < 200 mg/litre)?

A. Lagooning

B. Activated carbon adsorption

C. Biological oxidation pond

D. Chemical coagulation