

064/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Auxiliary theodolite station near an inaccessible main triangulation station :  
(A) change point (B) bench mark  
(C) satellite station (D) none of these
2. The maximum and minimum number of steps in a flight is equal to :  
(A) 12 and 1 (B) 18 and 2  
(C) 24 and 3 (D) 12 and 3
3. What is the angle of intersection of a contour and a ridge line?  
(A)  $0^\circ$  (B)  $90^\circ$   
(C)  $180^\circ$  (D)  $270^\circ$
4. If stiffness of a metal increases its ductility :  
(A) Decreases (B) Increases  
(C) Remains same (D) None of these
5. Temporary hardness in water is caused by the presence of :  
(A) Chlorides of Ca and Mg (B) Nitrates of Ca and Mg  
(C) Bicarbonates of Ca and Mg (D) Sulphates of Ca and Mg
6. A header bond is usually used for :  
(A) Half brick wall (B) One brick wall  
(C) One and a half brick wall (D) Two brick wall
7. Endurance limit of a metal is determined by :  
(A) Hardness test (B) Torsion test  
(C) Impact test (D) Fatigue test
8. An instrument is used to measure distance, horizontal angle and vertical angle :  
(A) Theodolite (B) Distomat  
(C) Total station (D) Tacheometer

9. For steel grade  $f_y = 415 \text{ N/mm}^2$  the value of  $x_u \text{ max/d}$  is :
- (A) 0.48 (B) 0.46  
(C) 0.43 (D) 0.53
10. A depression formed in a surface layer longitudinal to the road by the wheels of travelling vehicles is called :
- (A) Depression (B) Blow hole  
(C) Pot hole (D) Rut
11. Two and a half brick thickness of wall is roughly equal to :
- (A) 10 cm (B) 20 cm  
(C) 40 cm (D) 50 cm
12. In this process the soil particles are forced to move closer together by pounding action :
- (A) rolling (B) ramming  
(C) kneading (D) vibrations
13. White cement contains the following ingredient in least amount?
- (A) Lime (B) Silica  
(C) Iron oxide (D) None of these
14. Brick should have a minimum compressive strength of :
- (A)  $5.5 \text{ N/mm}^2$  (B)  $8 \text{ N/mm}^2$   
(C)  $10 \text{ N/mm}^2$  (D)  $12.5 \text{ N/mm}^2$
15. According to limit state of collapse values of partial safety factor for steel and concrete are :
- (A) 1 and 1 (B) 1 and 1.2  
(C) 1 and 2 (D) 1.15 and 1.5
16. The first staff reading is taken after the level is setup is called :
- (A) Back sight (B) Fore sight  
(C) Intermediate sight (D) None of these
17. In coastal region minimum grade of concrete for RCC as per IS 456-2000 :
- (A) M15 (B) M20  
(C) M25 (D) M30



18. The number of plastic hinges necessary to convert a beam fixed at one end and propped at other end is :
- (A) 1 (B) 2  
(C) 3 (D) 4
19. The bitumen grade 80/100 indicates :
- (A) Viscosity (B) Specific gravity  
(C) Penetration (D) None of these
20. The maximum limit of super elevation for plain terrain as per IRC recommendations is :
- (A) 1 in 10 (B) 1 in 15  
(C) 1 in 20 (D) 1 in 30
21. A simply supported beam carries a working live load of 2.5 kN/m and dead load is 3.5 kN/m . The design load for limit state of collapse is :
- (A) 6 kN (B) 7 kN  
(C) 9 kN (D) 12 kN
22. Standard EDTA solution is used to determine :
- (A) Hardness in water (B) Acidity in water  
(C) Chlorides in water (D) All of these
23. For a bar of diameter 'd' the anchorage value of hook is :
- (A) 8 d (B) 10 d  
(C) 16 d (D) 20 d
24. The ability of material to absorb large amount of energy is :
- (A) Elasticity (B) Ductility  
(C) Hardness (D) Toughness
25. The unit in which both sedimentation and digestion process of sludge take place simultaneously is :
- (A) Digestion tank (B) Skimming tank  
(C) Imhoff tank (D) Detritus tank
26. In the theory of plastic bending of beams, the ratio of plastic moment to yield moment is :
- (A) Shape factor (B) Plastic section modulus  
(C) Bulk modulus (D) Shear modulus

27. Camber on highway pavement is provided to take care of :  
 (A) Centrifugal force (B) Drainage  
 (C) Sight distance (D) Off tracking
28. Fine aggregate conforming of which zone is not recommended for making reinforced concrete :  
 (A) Zone I (B) Zone II  
 (C) Zone III (D) Zone IV
29. The quantity of Gypsum added in cement varies from 2 to 3% will depend upon the quantity of :  
 (A)  $C_3A$  in cement (B)  $C_4AF$  in cement  
 (C)  $C_3S$  in cement (D)  $C_2S$  in cement
30. Strain Energy per unit volume is called :  
 (A) Resilience (B) Proof resilience  
 (C) Bulk resilience (D) None of these
31. Bond between steel and concrete ensures :  
 (A) Stress compatibility (B) Strain compatibility  
 (C) Both (A) and (B) (D) None of these
32. Rapid curing cutback bitumen is produced by lending bitumen with :  
 (A) Benzene (B) Kerosine  
 (C) Diesel (D) Petrol
33. The relationship between the length ( $l$ ) and radius ( $r$ ) of an ideal transition curve is given by :  
 (A)  $l \propto r$  (B)  $l \propto \frac{1}{r}$   
 (C)  $l \propto r^2$  (D)  $l \propto \frac{1}{r^2}$
34. The minimum dissolved oxygen content (ppm) in a river necessary for the survival of aquatic life is :  
 (A) 0 (B) 2  
 (C) 3 (D) 4
35. Spire test is used for adjustment of :  
 (A) Line of sight (B) Adjustment of altitude bubble  
 (C) Horizontal axis (D) Vertical axis



36. The ratio of shear stress to shear strain is constant within elastic limit is called :
- (A) Torsional rigidity (B) Modulus of rigidity  
(C) Young's modulus (D) Volumetric strain
37. In trigonometric levelling, combined correction is :
- (A)  $0.0673 D^2m$  (B)  $0.0112 D^2m$   
(C)  $0.0785 D^2m$  (D) None of these
38. The increase in metacentric height :
- (A) Increase stability (B) Decrease stability  
(C) Increase comfort for passengers (D) All of these
39. What is the angle between two plane mirrors of an optical square?
- (A)  $15^\circ$  (B)  $30^\circ$   
(C)  $45^\circ$  (D)  $90^\circ$
40. Characteristic compressive strength of concrete is :
- (A) The same as the average cylinder strength  
(B) The same as the average cube strength  
(C) Lower than the average cylinder strength  
(D) Higher than the average cube strength
41. Distances are measured with instruments that rely on propagation, reflection and subsequent reception of either radio, visible light or infra red waves by :
- (A) Geodimeter (B) Telluro meter  
(C) Distomat (D) All of these
42. Coagulation – flocculation with alum is performed :
- (A) Before screening (B) After rapid sand filtration  
(C) Before rapid sand filtration (D) Immediately before chlorination
43. Three point problem can be solved by :
- (A) Graphical method (B) Tracing paper method  
(C) Trial and error method (D) All of these
44. The mass production of railway sleepers can be done with :
- (A) Hoyer system (B) Magnel system  
(C) Gifford udall system (D) None of these

45. A pre-stressed concrete beam is loaded with two point loads. The profile of cable is laid based on the load balancing concept, the shape of profile is :
- (A) Parabolic (B) Triangular  
(C) Trapezoidal (D) None of these
46. For a station to be free of local attraction :
- (A) Fore and back bearings of the line should be exactly same  
(B) Fore and back bearings of line should differ by exactly  $180^\circ$   
(C) Fore and back bearings of line should be measured accurately  
(D) None of these
47. Closed contours with higher value inside represent a :
- (A) hill (B) valley  
(C) plain surface (D) none of these
48. Consistency index for a clayey soil is [ Liquid limit = LL, Plastic limit = PL, Plasticity index = PI and natural water content = W ] :
- (A)  $LL - PL$  (B)  $\frac{W - PL}{PI}$   
(C)  $\frac{LL - W}{PI}$  (D) all of these
49. In a cantilever beam, if the length is doubled while keeping the cross section and the concentrated load acting at the free end is same, the deflection at the free end will increase by :
- (A) 2 times (B) 4 times  
(C) 6 times (D) 8 times
50. In levelling height of instrument is :
- (A) Height of levelling staff  
(B) Elevation of plane of collimation  
(C) Height of Tripod  
(D) Sum of reduced level of BM and foresight
51. Roof truss is provided when the span is :
- (A) less than 4 m (B) more than 5 m  
(C) between 4 m and 5 m (D) all of these



52. A 10 cm theodolite means that :
- (A) Diameter of the graduated circle of its lower plate is 10 cm  
 (B) Length of its telescope is 10 cm  
 (C) Height of the telescope is 10 cm  
 (D) Diameter of the graduated circle of its vertical circle is 10 cm
53. A column of length  $L$ , one end fixed, at other end lateral displacement and partial rotation. The effective length of column is :
- (A)  $0.5 L$  (B)  $0.7 L$   
 (C)  $L$  (D)  $1.5 L$
54. The expected life of cement concrete floor is taken as :
- (A) 10 years (B) 25 years  
 (C) 50 years (D) 100 years
55. The boundaries between the pavement and shoulder or foot paths are called :
- (A) Kerbs (B) Burrow pit  
 (C) Berms (D) None
56. Vertical windows built on sloping sides of a pitched roof :
- (A) Corner window (B) Bay window  
 (C) Dormer window (D) Glazed window
57. If 20 m arc length is the basis for the degree of curve then radius of curve is :
- (A)  $\frac{573}{D}$  metres (B)  $\frac{1146}{D}$  metres  
 (C)  $\frac{1600}{D}$  metres (D)  $\frac{5730}{D}$  metres
58. A pin jointed plane frame with ' $n$ ' number of member and ' $j$ ' number of joints will be stable :
- (A)  $n = 2j - 3$  (B)  $n > 2j - 3$   
 (C)  $n < 2j - 3$  (D) None of these
59. The permissible shear stress in concrete for beams without shear reinforcement depends upon :
- (A) Grade of concrete (B) Percentage of tension reinforcement  
 (C) Both (A) and (B) (D) None

60. The minimum grade of concrete used for post-tensioning system is :
- (A) M20 (B) M30  
(C) M40 (D) M60
61. A thin cylindrical vessel of internal diameter 'd' and thickness 't' subjected to fluid pressure 'p' longitudinal stress is :
- (A)  $\frac{pd}{2t}$  (B)  $\frac{pd}{t}$   
(C)  $\frac{pd}{4t}$  (D)  $\frac{pd}{8t}$
62. Reciprocal levelling eliminates the effect of :
- (A) Errors due to curvature of earth (B) Errors due to atmospheric refraction  
(C) Errors due to line of collimation (D) All of these
63. Pile caps are used on a group of piles to :
- (A) Increase the load bearing of each pile  
(B) Protect the piles from lateral displacement  
(C) Protect in case of offshore structure  
(D) Spread the vertical and horizontal loads to all the piles
64. According to IS 456-2000, maximum compressive stress in concrete for design purpose is taken as :
- (A) 0.380 fck (B) 0.416 fck  
(C) 0.446 fck (D) 0.670 fck
65. The relative density of a soil having maximum dry density  $rd(\max) = 2$  minimum dry density 1.2 and normal density is 1.6 :
- (A) 75% (B) 62.5%  
(C) 66.67% (D) 50%
66. If the uniformity coefficient  $C_u = 9$  and coefficient of curvature  $C_c = 1$  for a soil then  $\frac{D_{30}}{D_{10}}$  for the soil is :
- (A) 1 (B) 2  
(C) 3 (D) 4