CIVIL ENGINEERING

1)   Data from a sieve analysis conducted on a given sample of soil showedthat 67% of the particles passed through 75 micron IS sieve. The liquidlimit and plastic limit of the finer fraction was found to be 52 and 33 % respectively. The group symbol of the given soil as per IS:1498-1970 is

   CH

2)   The ratio of saturated unit weight to dry unit weight of dry unit weightis 1.25. If the specific gravity of solids (Gs) is 2.65, the void ratio of thesoil is

   0.663

3)   The water content at liquid and plastic limits of a soil sample is 65% and 29%respectively. Thepercentage of soil fraction with grain size finer than0.002 mm is 24. The activity ratio of the soil sample is

   1.5

4.   In a wet soil mass, air occupies one-sixth of its volume and wateroccupies one-third of its volume. The void ratio of the soil is

   1.00

5.   Clayey soil loses strength during remoulding and then regains its strength with the passage of time under unaltered water content. This phenomenon is called as

   Thixotropy

6.   Sedimentation analysis is done for particle size

   less than 0.075 mm

7.   In a two-layer soil system, the top and bottom soils are of samethickness, but the coefficient of permeability of the top soil is twicethat of the bottom soil of coefficient of permeability 'k'.What is the equivalent coefficient of permeability, when horizontal flow occurs?
   1.5k

8.   A uniform sand stratum 2.5m thick has specific gravity of 2.67and a natural void ratio of 0.67. The hydraulic head required to cause quick sand condition in the sand stratum is

   2.5m

9.   Which one of the following soil types is most likely to be subjectedto liquefaction under seismic forces?
  Loose saturated sands

10.   The time for a clay layer to achieve 85% consolidation is 5 years.If the layer was half as thick, 10 times more permeable and 4 timesmore compressible then the time that would be required to achievethe same degree of consolidation is
  6 months

11.   The natural void ratio of a saturated clay strata, 2.8 m thick is 1.1. The expected void ratio of the clay at the end of consolidation is to be 0.8. The total consolidation settlement of the claystrata is
  40 cm

12.   Compaction by vibratory roller is the best method of compaction incase of
  Well graded dry sand

13.   In an un-drained tri-axial test on a saturated clay, the Poisson's ratio

  $$\frac{\sigma_3}{\sigma_1+\sigma_3}$$

14)   A clay soil sample is tested in a tri-axial apparatus in consolidated drained conditions at a cell pressure of 100 kPa . What will be the pore water pressure at a deviator stress of 40 kPa ?
  0 kN/m^2

15.   The value of the standard penetration number (N) at 4 mdepth of a dry fine sand deposit after over burden correction is 19. The unit weight of the soil is 16kN/m^3. The N value after correcting for dilatancy will be

  19

16.   Identify the possible failure mechanism for a square footing of 1.0 m size and located at depth1.0 m from ground level in very dense sand
  General Shear

17.   The depth of unsupported excavation in expansive soil with unit weight, γ and undrained cohesion, c_u is
  4 c_u/γ

18.   What is the angle of wedge of soil based on Terzaghi's bearing capacity theory

  ϕ

19.   The contact pressure distribution under a rigid footing on a cohesionless soil would be
Zero at edges and maximum at centre

20.   In the under reamed pile, the bulb should be placed
 below the zone of moisture variation

21.   Efficiency of 3 x 3 square pile group is
   72

22.   What is the grip length in the design of well foundation?

 0.33 maximum scour depth
23. Which one is the correct statement among the following?

   None of the above

24. For 'no tension' in gravity wall, the eccentricity should lie

  within the middle third of the base width

25. In a forced vertical vibration test, the amplitude of vibration, A_z at a given frequency, f_z and acceleration, a_z in the vertical direction is

$$A_z = \frac{a_z}{4\pi^2 f_z}$$

26. The density of plain cement concrete, is generally taken as
   2400 kg/m^3

27. If 'P' is the percentage of water required for normal consistency, water to be added for determination of initial setting time, is
        0.85 P

28. Initial setting of cement is caused due to
 Tri-calcium aluminate

29. Soundness test of cement determines
    free lime content

30. If water required for 1 bag of cement is 20litres, the water cement ratio is :

0.40

31. The diameter of longitudinal bars of a column should never be less than

12 mm

32. If high yield strength deformed bars are used as reinforcement, the percentage of minimum reinforcement of the gross sectional area in slabs is

0.12%

33. The critical section in footing for one way shear would be at a distance of _____ from the face of the pedestal, where 'd' is the effective depth of the footing

d

34. Total pressure on the vertical face of a retaining wall of height h acts parallel to free surface and from the base at a distance of

h/3

35. Minimum Grade of concrete for an RCC construction under 'Severe' exposure condition should be

M 30

36. The limiting strain in concrete in Limit state of flexure is

0.0035

37. In a singly reinforced beam, if the strain in concrete reaches earlier than that yield strain in steel, the beam section is called

over reinforced section

38. As per Courbon's method the depth of diaphragms should be not less than

0.75d

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

45°

40. A column is regarded as long column if the ratio of its effective length to its least lateral dimension, exceeds

12

41. As per IS-456-2000, the allowable crack width under 'moderate' exposure conditions is

0.3mm

42. Side face reinforcement shall be provided in the beam when depth of the web in a beam exceeds

750 mm

43. The spacing of the main reinforcement bars in a slab, should not exceed the least of

1) three times the effective depth or 300 mm

44. Minimum grade of concrete for Post tensioned concrete is

M 30

45. How many types of losses in prestress are observed in pretensioned member?
4

46. The loss of prestress due to elastic deformation of concrete depends on:

Modular ratio and average stress

47. The lacing of compression members are to be designed for a transverse shear equal to at least

2.5 % of the axial force

48. In plastic analysis, the shape factor for rectangular cross sections, is

1.5

49. The effective length of a compression member of length 'L' effectively held in position at both ends but not restrained against rotation, is

L

50. The minimum pitch between the rivets should not be less than _____times the nominal diameter of the rivet.

2.5

51. The maximum slenderness ratio of a compression member subjected to both dead and superimposed load is

180

52. Shear buckling of web in a plate girder is prevented by providing

Vertical intermediate stiffner

53. As per IS :800 -2007 for compression flange the outstand of flange plates should not exceed

16 t

54. The Internal pressure coefficient on walls for buildings with large permeability is taken as

±0.7

55   The main principle of surveying is to work from
     the whole to the part

56   The curvature of the earth is ignored in
     Plane surveying

57 The curvature of the earth is taken into account when the extent of area is more than

250 km^2

58 Hydrographic surveys deal with the mapping of

large water bodies

59 In chain survey the area is divided into

triangles

60 A triangle is said to be well conditioned when its angles should lie between

30^0 and 120^0

61 In chain surveying field work is limited to

linear measurements only

62 The limiting length of an offset does not depend upon

scale of plotting

63 In quadrantal bearing system, back bearing of a line may be obtained from its forward bearing, by

changing the cardinal points, i.e. substituting N for S and E for W and vice-versa

64 In prismatic compass, the zero is marked on the

south

65 At the equator the dip of the needle is

0

66 The datum adopted for India is the

MSL at Karachi

67 The surface of still water is considered to be

Level surface

68 By arithmetical check we ensure the accuracy of

calculation

69 A contour line intersects a ridge line or valley or valley line

perpendicularly

70   A series of closed contours on a map indicates

summit

71   The face left position of Theodolite is also called

Telescope normal

72   The Gales method of traversing consists of of plotting the points by

inpendent coordinates

73   Overturning of vehicles on a curve can be avoided by using a

transition curve

74   A vertical curve is designated on the basis of

minimum sight distance

75   While designing a water supply of an industrial township, industrial and commercial water demand of total supply, is assumed

20 to 25%

76   The population of a city in 1980 is 50,000 The average per decade of the previous records of population is 5000 and average percentage per decade is 20% The population of the city based on geometrical increase method, in the year 2000 will be

72,000

77   Which formula is used to measure velocity of water in water supply main
     Hazen Williams

78   In a sedimentation tank (length L, width B, depth D) the settling Velocity of a particle for a discharge Q , is

$$\frac{\mathbf{Q}}{\mathbf{B \times L}}$$

79   The force which develops in a pressure conduit supported on trestles, is
     flexural stress

80   Which type of valve is used in house hold taps to control flow of water?
     Gate valve

81 The method of cleaning slow sand filter is
   Scraping top layer

82 The U.C (uniformity coefficient) $\frac{D60}{D10}$ for the best filter media sand
   should be
   2

83 When chlorine is added beyond the break-point the process of treating the water is
   known as
   Super chlorination

84 The most ideal disinfectant used for drinking water throughout the world is
   chlorine

85 The BOD is measured at

   5 days, 20^0 C

86 An equivalent of ppm with respect to water is
   mg/l

87 Water for domestic use should have

   no smell

88 Conductivity reflects

   compounds which readily disassociate in solution

89 Conductivity is standardized at

   (3) 25^oC

90 pH of one water sample is 7, pH of another water sample of same quantity is 8,
   then pH of the mixture is
   7.26

91 Higher pH for water is undesirable because
   it renders chlorination less effective

92 BOD represents
   pollution strength of biodegradable waste

93 BOD test is standardized at
   20^0C and 5 days

94 Time taken for COD test is about
3 hours

95.The main features of Expressways are

All of the above

96.The capacity of a highway facility in vehicles per hour per lane when **V** is speed in K.P.H and**S** is average spacing in mts between successive moving vehicles is given by

C=1000V/S

97.Grade compensation is not necessary for gradients flatter than

4 %

98 The purpose of carrying out the soundness test on aggregates is to determine its

Durability

99. To prevent percolation of water into formation moorum is used as blanket for

black cotton soil

100.The weight of a concrete sleeper is almost

215 to 270Kg

101. Fish plate is named so because

The fitting is shaped like a fish

102. Creep is the

Longitudinal movement of rail

103. A central longitudinal space separating dual carriageways is known as

Median

104. The design of intersections is done using

Peak hour traffic

105. The strength of the water bound macadam course is primarily due to

both a & b

106. As per Indian practice the design period for a rigid pavement is

20ys

107. When the pavement width is more than 5mts , the type of joints required to be provided to facilitate the construction of pavement in strips are

Construction joints

108. The traffic growth rate value adopted in India on National Highways is

7.5%

109. The amount of camber to be provided depends on

Intensity of rainfall

110. Newton's law of viscosity relates

shear stress and rate of angular deformation

111. Cavitation is caused by
High Pressure

112. Surface tension of water
Increases with decrease in temperature

113. In a static fluid, the pressure at a point is
equal in all directions

114. The Centre of pressure of a liquid on a plane surface immersed vertically in a static body of liquid, always lies below the centroid of the surface area because

The liquid pressure increases linearly with depth

115. Which of the following velocity potentials satisfies continuity equation?
$$x^2 - y^2$$

116. A control volume refers
an open system

117. Stream lines and path lines always coincide in case of
steady flow

118. The type of notch which is used for measuring lower discharges

 V-Notch

119. Navier-Stokes equations are useful in the analysis of

 viscous flows

120. The velocity distribution at any section of a pipe for steady laminar flow is
 parabolic

121. At the stagnation point in a flow field
 velocity head gets converted into pressure head

122. For the pipes arranged in parallel
the head loss across each of the pipe must be same

123. When water is lifted by a pipeline from a reservoir to a height grater than the level in the supply reservoir, the pipe is called
siphon

124. The hydraulic gradient line is
at velocity head below the energy gradient line

125. The momentum correction factor for laminar flow in pipes is
1.33

126.   Steady flow in an open channel exists when the
 depth does not change with time

127.   In the uniform flow in a channel of small bed slope , the hydraulic grade line
 coincides with the water surface

128. In the study of forces acting on Aeroplane flying with supersonic velocity ; which non dimensional number plays important role
 mach number

129). Higher specific speeds of centrifugal pump indicate that the pump is of
     axial flow type

130. In reaction turbine the cavitation may occur at
 runner exit

131. Pump used in pumping highly viscous fluids belong to the category of **centrifugal pump** [ ]

132. In centrifugal pumps, cavitation is reduced by
reducing the suction head

133. Two identical pumps in all respects and each is capable to deliver Q m^3/ s against the head of H are connected in parallel, the resulting discharge is
less than 2Q against a head of H

134. Orographic precipitation occurs due to air masses being lifted to higher altitudes by
the presence of mountain barriers

135. the mass curve of rainfall of a storm is a plot of

accumulated precipitation vs time in chronological order

136. The chemical that is found to be most suitable as water evaporation inhibitor is

cetyl alcohol

137. A hydrograph is a plot of

stream discharge against time

138. a unit hydrograph has one unit of

direct runoff

139. The basic assumption of the unit hydrograph theory are

time invariance and linear response

140. an aquifer confined at the bottom but not at the top is called

unconfined aquifer

141. the volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called

specific yield

142. In a cantilever beam of length L carrying a udl of W kN/m , the maximum bending moment is

WL^2/2

143. The strength of the beam mainly depends on

Section modulus

144.if the moment of inertial of the section is **I**, M is the Moment of Resistance and the extreme fiber distance from neutral axis of a section is **y**,The section modulus for a section is given as

I/y

145. In I section of a beam subjected to transverse shear force S the maximum shear stress is developed at

The center of the web

146.For which one of the following cases is the Muller-Breslau principle applicable to get influence line?
Forces and moments at any section

147.Stiffness method of structural analysis starts with
Equilibrium condition

148. if E,I, L are young's modulus of Elasticity, moment of inertia and the length of a member. The moment required to rotate the near end of a prismatic beam through unit angle without translation, when the far end is fixed, is

4EI/L

149. if E,I, L are young's modulus of Elasticity, moment of inertia and the length of a member Stiffness factor for a freely supported at both ends is

.3EI/L

150. For a portal frame ABCD with side sway, if the displacement factor in the member

BA is -3/4 then the displacement factor in the member CD is

-3/4