Civil Engineering Initial Key

1. The difference between total float and free float is known as
   Interfering float
2. A fictious activity used to maintain sequential order is known as
   Activity

3. Critical Activity have
   Zero float
4. PERT network is based on
   Beta Distribution

5. The performance of a specific task in CPM, is known
   Activity

6. Veneering means
   A thin layer of superior wood glued to inferior wood

7. The main function of Alumina in brick Earth is to
   Impart plasticity

8. When Timber is subjected to dry rot, ... is an excellent prevention
   Solignum
9. Concrete should not be dropped as all this would cause
   Segregation

10. Pick up the correct proportions of chemical ingredients of cement
    Lime : Silica : Alumina : Iron oxide : 63 : 22 : 6 : 3

11. 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
12. The preliminary test is repeated if the difference compressive strength of three test specimens, exceeds _____.
    8 kg/cm^2

13. The area under the Beta distribution curve is divided into two equal parts by
    Expected time
14. In the time-cost optimization, using CPM method for network analysis, the crashing of the activities along the critical path is done starting with the activity having
    Least cost slope

15. For a structure subjected to the action of sea water, the cement used is

    High alumina cement

16. Poisson's ratio for concrete
    Increases with rich mixes

17. The presence of calcium chloride in water
    Accelerates setting of cement

18. Non-destructive testing is used to determine
    location of defects

19. The clay and silt content in a good brick earth must be at least
    40%

20. Dry rot in timber is the result of:
    Fungal attack

21. Steady flow in open channel exists when the

depth does not change with time

22. In the uniform flow in a channel of small bed slope, the hydraulic grade line

essentially coincides with the free surface

23. In a triangular channel the value of ratio of depth and specific energy at critical flow (E_c/Y_c) is

1.25

24. Hydraulic jump is expected when slope of a channel

changes from steep to mild

25. Dynamic Similarity exists when the model and prototype have the same

length scale ratio, velocity scale ratio and force scale ratio

26. An unconfined aquifer is one in which:

Water surface under the ground is at atmosphere pressure

27. Water enters the soil at capacity rate when:

Intensity of rainfall is more than the infiltration capacity of the soil

28. In a flow duration curve is plot of

stream discharge against the percentage of times the flow is equaled or exceeded

29. For a given gravity dam the coefficient of friction μ is 0.60 and the value of sliding factor as obtained from the calculations is 0.68, the factor of safety against sliding is

0.882

30. If a crop requires a total depth of 1 m of water for the base period of 150 days then duty of water is:

1296 hectares/cumec

31. If the duty for a base period of 120 days is 1500 hectares/cumec, then the delta for the crop is approximately

690mm

32. If the pan evaporation indicates a total early evaporation of 1.5m, then the annual water loss by evaporation from the reservoir of water surface area 100 km^2 will be:

1.5 x 10^4 ha-m

33. A well of radius 100 mm penetrates fully a confined aquifer. If the radius of the well is doubled and the radius of influence is 300m in both the cases the % increase in the discharge is approximately.

9.5%

34. With increase in quantity of water supplied the yield of most crops:

Increases upto certain limit then falls

35. Max. height of a dam upto which it may be designated as low dam is given by (with usual notation)

$$H = \frac{f}{w(s - c + 1)}$$

36. A detention basin for flood control is the one which is provided with

controlled outlets and spillway.

37. If a river in alluvial plain has a dominant discharge of 1600 cumec, the waterway for a bridge river should be approximately
190 m

38. For no tension at any point in a gravity dam the criterion satisfied is:

The resultant force for all conditions of loading must pass through the middle third of the base

39. For a basin of area 500 ha, unit hydrograph is of a triangular shape with base period 20 hours. The peak discharge in m/hour is

5000

40. A land is known as waterlogged when
capillary fringe reaches the root zone of the plants

41 Turbidity is measured on

standard silica scale

42. If the total hardness of water is greater than its total alkalinity, the carbonate hardness will be equal to

total alkalinity

43. The settling velocity of a particle in a sedimentation tank depends on

surface area of tank

44. Alum as a coagulant is found to be most effective when pH range of water is

6.5 to 8.3

45. The design period recommended by the Govt. of India Manual on water supply is,

30 years

46. The process in which the chlorination is done beyond the break point is known as

super chlorination

47. IS 10500: 2012 drinking water standards base upper limits for Fluoride i.e Permissible Limit in the Absence of Alternate Source.

1.5 mg/L

48. As compared to cast iron pipes, steel pipes are

stronger

49. The rate of BOD exerted at any time is

directly proportional to BOD remaining ,

50. The ratio of 5 day BOD to ultimate BOD is about

2/3

51. The Nitrogenous demand in BOD at $37^O C$ starts after about

5 days

52. The means of access for inspection and cleaning of sewer line is known as

manhole

53. The nornal or medium manhole has depth about:

1.5 m

54. Leachate is a coloured liquid, that comes out of

Sanitary landfills

55. Biomedical waste (Management and Handling Rules) were enacted in India under Environmental Protection Act,1986, in the year

1998

56. Air binding phenomena in rapid sand filters occur due to

   Excessive negative head

57. During Inversion:

   Temperature increases with altitude

58. A trickling filter plant treats 1200 m³ / day of sewage with a BOD_5 of 220 mg / l and SS of 250 mg / l . The total solid production , assuming that primary clarification removes 30 % of BOD and 60 % of influent solids. Assume solid production in trickling filter is @ 0.5 kg / kg of applied BOD.
   272.4 kg / day

59. The ozone hole appears in Antarctica during
   late winter

60. The main disadvantage of oxidation pond is that
   large area is required for construction

61. The strain energy stored by a member is equal to the amount of

work done by external forces on the member

62. A structural member elongates by δl under axial tension of 'P'. The external work done will be

P. δl/2

63. The maximum deflection of a fixed beam carrying a central load W is equal to

$$\frac{Wl^3}{192EI}$$

64. For a fixed ended prismatic beam carrying a uniformly distributed load, the ratio of bending moment at mid- span to that at supports is

0.5

65. Principle of superposition is applicable when

deflections are linear function of applied force

66. Shear force at any section in a conjugate beam, gives in the actual beam

slope

67. Maxwell's Reciprocal theorem is applicable to

linearly elastic structure

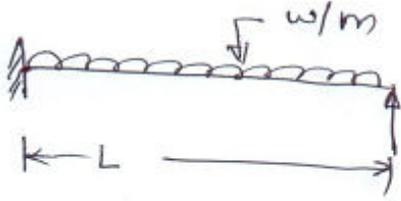68. Castigliano's II theorem is

used to find known redundant reaction

69. In case of a fixed beam carrying point load at mid- span, the collapse load will be

8 M_p/l

70. If A is the total cross-section area, the area of the tension zone at the condition of plastic zone will be
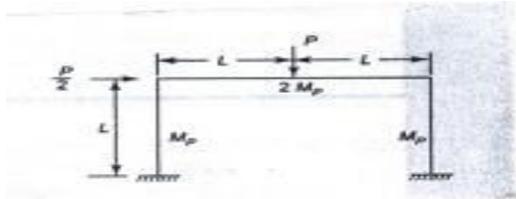
A/2

71. For the given beam shown in figure below the moment at fixed end will be

$$\frac{wl^2}{8}$$

72. A portal frame is as shown in figure below the ultimate load Pu considering all possible mechanisms will be.

16 M$_p$/3 l

73. The height of the crown of a parabolic camber of 1 in 36 with respect to the edges on a road having carriageway width of 3.75 m is

5.21 cm

74 The safe stopping sight distance on a single lane level road stretch having coefficient of longitudinal friction as 0.37 for design speed of 50 kmph and for two-way traffic is

122.8 m

75. Length of a vehicle affects

extra width of pavement

76. The length of the summit curve having SSD as 150 m and deviation angle as 1 in 30 is

170 m

77. The direct interchange ramp involves

Diverging to the right side and merging from right

78. The type of interchange which is most suitably satisfies the requirements of turning traffic is

Cloverleaf

79. The maximum possible value of Group Index of the soil is

20

80. The upper speed for traffic regulation as estimated using spot speed studies is

85th percentile

81. The load value as determined using plate load test corresponding to mean settlement value of 0.125cm is 1490 kg. The modulus of subgrade reaction for 30 cm diameter plate is

16.86 kg/cm³

82. The maximum spacing of contraction joints in plain cement concrete pavement as per IRC is:

4.5 m

83. Bitumen of grade 80/100 means

its penetration value is 8mm to 10mm at 25 ℃

84. The amount of emulsifier in percentage by weight of finished emulsion that is usually taken for preparation of normal road emulsions ranges from:

0.5% to 1.0%

85. The critical combination of stresses for corner region in cement concrete pavements is

Load stress + Warping Stress

86. The consolidation of flexible pavements layers is the major cause of

Formation of longitudinal ruts

87. If true bearing of a survey line is 316º0' and declination is 4 º15' E, the magnetic bearing of the line is

311 º45'

88. Removal of parallax in the telescope of the theodolite can be carried out by

Refocussing the eyepiece and objective

89. If D is the distance between levelling instrument and station, combined corrections for removing the effects of curvature and refraction is given by

-0.0673D²

90. In the triangulation survey, the intervisibilty of the stations can be checked by

Captain G.T. McCaw's Solution

91. Contours of different elevations may cross each other only in the case of

a vertical cliff

92. Type of spatial data format which is most suitable for mapping roads in GIS is

TIN

93. The type of resolution of satellite images that signifies the degree of intensities of radiation the sensor is able to distinguish is

Radiometric Resolution

94. The three dimensional visual interpretation of the aerial images can be possible through

Stereoscopic Fusion

95. The fundamental natural period of a steel- frame building without brick in-fill panels is given by

0.85 h^{0.75}

96. A structure is to be constructed where basic wind speed is 47 m/s, risk factor = 1, terrain and size factor is 0.98, topographic factor = 1.0. the basic wind pressure would be about

1273 N/mm²

97.   If the number of possible plastic hinges are 4 and the degree of indeterminacy of the structure is 2 then the number of possible independent mechanism(s) n will be

2

98 . Which of the following is a service ability criteria ?

Fire resistance

99. If the diameter of a bolt is 20 mm then the maximum number of bolt(s) that can be accommodated in one row in a 140 mm wide flat is (are)

2

100. The maximum pitch of the bolts for a compression member should not exceed

12t or 200 mm which is less

101. The nominal strength of a fillet weld is

$f_u/\sqrt{3}$

102. For fillet welds subjected to normal (f_a) and shear (q) stresses, the equivalent stress is given by

$$\sqrt{f_a^2 + 3q^2}$$

103. The slenderness ratio in a tension member as per IS code where reversal of stress is due to loads other than wind or seismic should not exceed

350

104. The design tensile strength of a member due to yielding of gross section T$_{dg}$ is given by

$\dfrac{A_g f_y}{\gamma_{m1}}$

105. The best double-angle compression member section is

unequal angles with long legs back-to-back

106. The design compressive stress of an axially loaded compression member in IS 800-2007 is given by

Perry Robertson formula

107.Full lateral restrained to compression flange for laterally supported beams may be assumed to exist if the frictional restraint or other restraints in the form of shear connectors or bracing of adjacent beam compression flanges are capable of resisting a lateral force

not less than 2.5% of the maximum force in the compression flange

108. As per IS: 800 purlins are designed as

continuous beams

109. Vertical stiffeners in a bolted plate girder are

Crimped, placed alternately on both sides of web and placed with a maximum spacing of 200 times thickness of web

110. The connection of vertical stiffener to the web of plate girder are designed for

shear force $\dfrac{t_w^2}{5b_s}$

111. Pick up the correct statement :

For manually operated cranes the maximum permissible deflection of gantry girder is span/500.

112. The percentage of high – strength deformed bars in one – way slabs to cater for shrinkage or temperature, as per IS 456, is …..

0.12%

113. The allowable maximum crack width under mild exposure is….

0.3 mm

114. The minimum grade of concrete for moderate environment is….

M25

115. The minimum number of days concrete elements have to be cured when blended cements or mineral admixtures are used is….

10-14 days

116. Minimum cover to be provided for columns as per IS 456 is

40mm

117. The standard deviation suggested by IS 456:2000 for design of grade M20 concrete is….

4 N/mm²

118.How many cube specimens form a sample?

4 consecutive non-overlapping

119. The final deflection limitation for floors and roofs as per IS 456 is….

Both Span/350 and 20mm

120. The ultimate strain in concrete in bending is assumed in the IS code as

0.0035

121. The maximum strain in the tension reinforcement in the section at failure should be

Less than ($f_y/1.15\ E_s$) +0.002

122. Side face reinforcement should be provided, when the depth exceeds….

750mm

123. As per IS code, prestressed concrete members subjected to shear , torsion and bending are Analysed by

Skew bending theory

124. The maximum spacing of an inclined stirrup is ….

1.0d or 300mm,whichever is less

125. The best way to resist torsion is to provide ….

Vertical closed stirrups and longitudinal bars

126. The positive bending moment coefficient at the middle of the end span of a continuous one-way slab is….

($w_lL^2/10$)+($w_dL^2/12$)

127. Minimum concrete cover of prestressing steel for a pretensioned member exposed to weather shall be at least

32 mm

128. Minimum cement content for severe exposure and corresponding minimum grade of concrete as per IS 456 are

250kg and M30

129. The loss of pre-stress due to wobbling effect is because

Of friction met within a straight tendon due to slight imperfection of the duct

130. In order to achieve a safe compressive strength of 2 Kg / cm^2 in brick masonry what should be the suitable range of crushing strength of bricks

35 Kg / cm^2 to 70 Kg / cm^2

131. Limiting slenderness for a load bearing wall in cement mortar of H$_1$ for dwelling units one or two storeys shall be

27

132.   Effective length of a wall supported by cross wall / pier etc. at both ends shall be

L

133.   Normal permissible tension in masonry made in 1: 5 cement sand mortar for abutment of culverts shall be

(4) 0.07 N / mm^2

134. For a masonry built in M_1 mortar or equivalent, a horizontal shear stress f_s = 0.1 + f_d / 6 may be permitted, where f_d is the actual compressive stress on section due to dead loads , but the value should be less than

0.5 N / mm²

135. If the water content of a fully saturated soil mass is 100%, then the void ratio of the sample is:

Equal to specific gravity of soil

136. The hydraulic head that would produce a quick condition in a sand stratum of thickness 1.5m, specific gravity 2.67 and void ratio 0.67 is equal to

1.5m

137. Which of the following method is best suited for determination of permeability of coarse grained soil?

Constant head method

138. Within the consolidation process of a saturated clay

A gradual decrease in neutral pressure and a gradual increase in effective pressure takes place and sum of the two is constant

139. With the increase in the amount of compaction energy

Optimum water content is decreases but maximum dry density increases

140. During the first stage of triaxial test when the cell pressure is increased from 0.10 N/mm² to 0.26 N/mm², the pore water pressure increases from 0.07 N/mm² to 0.15 N/mm². Skempton's pore pressure parameter B is

0.5

141. The major principal stress in an element of cohesionless soil within the backfill of a retaining wall is

Vertical if the soil is in an active state of plastic equilibrium

142. A combined footing is generally used when

Number of column is two and they are spaced close to each other

143. The gross bearing capacity of a footing is 450kN/m². If the footing is 1.5 m wide at a depth of 1 m in clayey soil with unit weight of 20 kN/m³, then the net bearing capacity (in kN/m²) will be

430

144. In hydrometer analysis for a soil mass

meniscus correction is additive and dispersing agent correction is subtractive

145. The difference between maximum void ratio and minimum void ratio of a sand sample is 0.30. if the relative density of this sample is 66.6% at a void ratio of 0.40, then the void ratio of this sample at its loosest state will be

0.60

146. Approximate ratios of the permeabilities of two clean soils having D_{10} = 0.6 mm and D_{10} = 0.3 mm respectively is

4.0

147. Water is flowing in an upward direction through a stratum of sand, 4m thick, under a total head difference of 2 m. the sand has a sp. gr. of 2.65 and void ratio of 0.065. The factor of safety against quick sand condition would be

3.0

148. For a certain loading condition, a saturated clay layer undergoes 40% consolidation in a period of 178 days. What would be the additional time required for further 20% consolidation to occur?

222.5 days

149. In a Triaxial test at failure, major principal stress was 180kPa, minor principal stress was 100kPa, and pore pressure was 20kPa. The sine of the angle of shearing resistance of the sandy soil tested is

1/3

150. Bentonite is a material obtained due to the weathering of

Volcanic ash