

AE – Civil

1. In a tilted aerial photograph, if the swing is 230° , then the rotation angle is equal to
 - a. 25°
 - b. 50°
 - c. 130°
 - d. 140°

2. The foundation in which a cantilever beam is provided to join two footings, is known as
 - a. Strip footing
 - b. Strap footing
 - c. Raft footing
 - d. None of these

3. In consolidation testing, curve fitting method determines
 - a. Swelling Index
 - b. Compression index
 - c. Coefficient of Compression
 - d. None of these

4. A point load applied at shear centre induces
 - a. Zero bending
 - b. Pure twisting
 - c. Zero shear force
 - d. Pure bending

5. The under surface of an arch is called
 - a. Intrados
 - b. Haunch
 - c. Soffit
 - d. Back

6. Arches in the form of masonry arcs struck from more than four centres, are called
 - a. Ogee Arches
 - b. Gothic Arches
 - c. Drop Gothic Arches
 - d. Two Curved Arches

7. Which one of the following is the appropriate triaxial test to assess the immediate stability of an unloading problem?
 - a. CU test
 - b. CD test
 - c. UU test
 - d. None of the above

8. Budgeting with Bar chart helps in the determination of
 - a. Total cost of a project
 - b. Direct cost of a project
 - c. Indirect cost of a project
 - d. Total time along with the cost of a project

9. The angular stairs that are used to change the direction of the stairs is called
- Angular steps
 - Winders \$
 - Round steps
 - Radial steps
10. Distemper is used to coat
- Compound walls
 - External concrete surfaces
 - Woodwork
 - Interior surfaces not exposed to weather \$
11. In respect of moisture content in wood, the fiber saturation point refers to which one of the following?
- Free water present in the cells
 - Free water present in cell walls and cell cavities
 - No moisture present in cell walls and cell cavities
 - No free water exists in cell cavities but cell walls and saturated \$
12. Which one of the following is correct?
- A statically indeterminate structure is the one which cannot be analyzed at all
 - A statically indeterminate structure is the one which can be analyzed using equations of static's only
 - A statically indeterminate structure is the one which can be analyzed using equations of static's and compatibility equations \$
 - A statically indeterminate structure is the one which can be analyzed using equations of compatibility only
13. Some structural members subjected to long time sustained loads deform progressively with time especially at elevated temperatures. What is such a phenomenon called?
- Fatigue
 - Creep \$
 - Creep relaxation
 - Fracture
14. The ratio of total elongation of a bar of uniform cross-section produced under its own weight to the elongation produced by an external load equal to the weight of the bar is
- $\frac{1}{4}$
 - $\frac{1}{2}$ \$
 - 1
 - 2
15. A symmetrical I section is subjected to shear force. The shear stress induced across the section is maximum at which location?
- Extreme fibers
 - At the bottom of flanges in flanges
 - At the bottom of flanges in web portion
 - At the neutral axis \$
16. Which one of the following is the correct range of fineness modulus of medium sand usable in preparing cement mortar?
- 1.5 to 2.2
 - 2.6 to 2.9 \$
 - 2.9 to 3.2
 - 5.5 to 6.5

17. What is the nature of stress in a ceiling fan rod?
- Bending
 - Tensile
 - Compressive
 - Shear \$
18. What is the percentage of the fine aggregate of fineness modulus 2.6 to be combined with coarse aggregate of fineness modulus 6.8 for obtaining combined aggregate of fineness modulus 5.4?
- 30%
 - 40%
 - 50% \$
 - 60%
19. In respect of ordinary Portland cement, the proportion of Tricalcium silicate is
- 6 % - 8 %
 - 10 % - 12 %
 - 25 % - 30 %
 - 50 % - 60 % \$
20. Which one of the following pairs relating to flumes carrying open channel flow is correctly matched?
- N – modular flume – flow is unaffected by drowning
 - Venturi flume – standing wave forms at the throat
 - Standing wave flume – hump is not provided at the throat
 - Venturi flume – flow at the throat is less than the critical velocity \$
21. In a body loaded under plane stress conditions, what is the number of independent stress components in order to completely specify the state of stress at a point?
- 3
 - 4 \$
 - 6
 - 9
22. A particle of mass 3 kg moving in a straight line decelerates uniformly from a speed of 40 m/s to 20 m/s in a distance of 300 m. How much distance will the particle travel before it comes to rest?
- 10 m
 - 20 m
 - 50 m
 - 100 m \$
23. The maximum tolerance in a 20 m chain is
- 2 mm
 - 3 mm
 - 5 mm \$
 - 8 mm
24. The correction for sag is
- Always additive
 - Always subtractive \$
 - Sometimes additive and sometimes subtractive
 - Always zero

25. Which one of the following is correct?
- A determinate structure cannot be analyzed without the correct knowledge of modulus of elasticity
 - A determinate structure must necessarily have roller support at one of its ends
 - A determinate structure requires only statically equilibrium equations for its analysis
 - A determinate structure will have zero deflection at its ends
26. A circular shaft is subjected to a bending moment M_b and a twisting moment M_t . What is the ratio of maximum shear stress and the maximum bending stress?
- $2M_t/M_b$
 - M_t/M_b
 - $M_t/2M_b$
 - $1.5M_t/M_b$
27. The following are the steps that are involved in making a spigot and socket joint of cast iron pipes used in water supply systems
- Tarred gasket or hemp yarn is wrapped around the spigot.
 - The spigot end is centered into the socket end of the preceding pipe.
 - A joining ring end is placed around the barrel and against the face of the socket.
 - The gasket or hemp yarn is caulked slightly.
 - Molten pig lead is poured and then caulked.
- What is the correct sequence of these steps?
- 1, 2, 3, 4, 5
 - 1, 2, 3, 5, 4
 - 1, 2, 4, 5, 3
 - 1, 3, 4, 5, 2
28. Cross staff is an instrument used for
- Measuring approximate horizontal angles
 - Measuring bearings of lines
 - Setting out right angles
 - None of the above
29. Local attraction in compass surveying may exist due to
- Presence of magnetic substance near the instrument
 - Incorrect levelling of the magnetic needle
 - Friction of the needle at the pivot
 - Loss of magnetism of the needle
30. The horizontal angle between the true meridian and magnetic meridian at a place is called
- Declination
 - Azimuth
 - Magnetic bearing
 - None of the above
31. The absolute maximum Bending Moment in a simply supported beam of span 20 m due to moving udl of 4 t/m spanning over 5 m is
- $87.5 t - m$ at the support
 - $87.5 t - m$ near the midpoint
 - $87.5 t - m$ at the midpoint
 - None of the above

32. By which one of the following methods is an approximate quick solution possible for frames subjected to transverse loads?
- By cantilever or portal –method \$
 - By strain energy method
 - By moment distribution method
 - By matrix method
33. A metallic tape is made of
- Steel
 - Linen
 - Cloth and wires \$
 - Invar
34. A series of closely spaced contour lines represents a
- Steep slope \$
 - Gentle slope
 - Uniform slope
 - Plane surface
35. The two point problem and three point problem are methods of
- Resection
 - Orientation
 - Traversing
 - Resection and Orientation \$
36. Which of these will make timber more fire resistant?
- Charring
 - Sir Abel's process
 - Dipping and steeping process
 - Hot and cold open tank treatment \$
37. The graphical condition for equilibrium of concurrent forces is that
- Force polygon should be a closed figure
 - Force polygon need not be a closed figure
 - Funicular polygon should be a closed figure
 - Both the funicular polygon and force polygon should be a closed figure \$
38. Probabilistic estimation of a construction project includes
- Labour
 - Productivity
 - Wages
 - All of these \$
39. A cylindrical shell made of mild steel plate of 100 cm diameter is to be subjected to an internal pressure of 10 kg/cm^2 . The material yields at 2000 kg/cm^2 . Also, assume the factor of safety as four and use the maximum principal stress theory. What will then be the thickness of the plate?
- 5 mm
 - 10 mm \$
 - 15 mm
 - 20 mm

40. The discharge per metre width at the foot of a spillway is $10 \text{ m}^3/\text{s}$ at a velocity of 20 m/s . What should be the approximate tail water depth for a perfect free hydraulic jump to occur at the foot of the spillway?
- 4.50 m
 - 5.0 m
 - 5.50 m
 - 6.50 m
41. The distance between two bench marks is 1000 m. It is observed that during levelling, the total error due to collimation, curvature and refraction is $+ 0.120 \text{ m}$. Given this, what is the magnitude of the collimation error?
- 0.000527 m
 - 0.00527 m
 - 0.0527 m
 - 0.527 m
42. The most commonly used solvent in oil paints is
- Petroleum
 - Spirit
 - Turpentine
 - Coal tar
43. Lime containing a high percentage of calcium oxide is generally called
- Fat lime
 - White lime
 - Rich lime
 - None of the above
44. Rocks in which argil (or clay) predominates, are called
- Argillaceous rocks
 - Igneous rocks
 - Calcerous rocks
 - None of the above
45. What does a station pointer do?
- For plotting of surrounding in harbor area
 - For making tidal observations
 - For marking sunken shipping hazards
 - None of the above
46. Mastic asphalt is normally used for
- Sound proofing
 - Water proofing
 - Fire proofing
 - None of these
47. Cement becomes unsound in the presence of
- Sulphur
 - Lime
 - Magnesium
 - All of these
48. The percentage of nickel in Invar is
- 12 %
 - 24 %

- c. 36 % \$
 - d. 48 %
49. The maximum area of tension reinforcement in beams should not exceed
- a. 2%
 - b. 4 % \$
 - c. 6%
 - d. 8 %
50. What is the approximate ratio of bearing capacity of double Under Reamed (U.R.) pile to that of single U.R. pile?
- a. 1.25
 - b. 1.5 \$
 - c. 1.75
 - d. 2
51. Acrylic is the name of
- a. Celluloid resin
 - b. Alkalyd resin
 - c. Methyl meta crylate \$
 - d. None of these
52. Soundness of cement is tested by
- a. Vicat's apparatus
 - b. Le – Chatelier's apparatus \$
 - c. Compressive strength testing apparatus
 - d. None of the above
53. Marble is a
- a. Metamorphic rock
 - b. Igneous rock
 - c. Calcerous rock \$
 - d. None of the above
54. Which of the following is a plutonic rock?
- a. Granite \$
 - b. Dolerite
 - c. Basalt
 - d. None of the above
55. A beam is made of two identical metal flats soldered together. What is the ratio of stiffness of this beam to the stiffness of a beam in which the two flats are not soldered and which acts independently?
- a. 2
 - b. 4 \$
 - c. 6
 - d. 8
56. A composite system where the components are of equal lengths is subjected to temperature rise. Which one of the following stresses will be developed in the component having highest coefficient of linear expansion? ‘
- a. Compressive stress \$
 - b. Tensile stress
 - c. Shear stress
 - d. Zero stress

57. A plan of an area drawn with the original scale of 1 cm = 10 m, has shrunk such that a line, originally 15 cm long on the plan, measures now 14.5 cm. What is the new scale?
- 1 cm = 10.34 m
 - 1 cm = 10.97 m
 - 1 cm = 9.70 m
 - 1 cm = 0.97 m
58. The estimate based on a detailed quantity survey and furnishes the most accurate and reliable estimate possible is known as
- Conceptual estimate
 - Definitive estimate
 - Probabilistic estimate
 - None of these
59. A cold drawn seamless steel tubing subject to internal pressure, has a diameter of 6 cm and wall thickness of 0.2 cm. The ultimate strength of steel is 3600 kg/cm². What is the bursting pressure (in kg/cm²)?
- 120
 - 240
 - 480
 - 960
60. The main purpose of project cost control is
- To provide a feedback to the estimator
 - To promote cost consciousness
 - To signal the impact of uneconomic operations
 - All of the above
61. Which of the following statement is true?
- Cement mortar adheres more effectively to brick surface than any other material
 - Cement mortar adheres least effectively to brick surface than any other material.
 - Cement mortar does not adhere to brick surfaces at all
 - Cement mortar adheres to brick surface as effectively as with any other material.
62. Mastic Asphalt is
- A heat resistant material
 - An acid resistant material
 - A non – corrosive material
 - None of the above
63. Jhumb bricks are
- Under burnt / baked
 - Over burnt / baked
 - Not burnt / baked
 - None of the above
64. The strain energy stored in bending is just _____ of the uniaxial tension or compression.
- 1/8
 - 1/4
 - 1/3
 - 1/2

65. The intensity of direct longitudinal stress in the cross-section at any point distant r from the neutral axis, is proportional
- $1/r^2$
 - $1/r$
 - r
 - r^2
66. If the atmospheric pressure on the surface of an oil tank (sp. gr. 0.8) is 0.1 kg/cm^2 , the pressure at a depth of 2.5 m, is
- 1 metre of water
 - 2 metre of water
 - 3 metre of water
 - 4 metre of water
67. A horizontal rod XY carries three loads of 3.0 kg, 7.0 kg and 10.0 kg at distances of 2.0 cm, 9.0 cm and 15 cm respectively from X where it is hinged. Neglecting the weight of the rod, which is the point at which the rod will be balance?
- 10.45 cm from X
 - 11.25 cm from X
 - 12.55 cm from X
 - None of the above
68. What is the content of clay and silt in good brick earth?
- 20 %
 - 30 %
 - 40 %
 - 50 %
69. What is the ratio of load carrying capacity of a fixed beam to that of a cantilever beam of same span having same maximum bending moment and loaded with uniformly distributed load throughout the span?
- 6
 - 4
 - 3
 - 2
70. Mild steel is used for
- Columns and struts
 - Small sized water pipes
 - Structural works in beams, joints and girders
 - None of these
71. The type of brick masonry bond provided for heavy loads on masonry is
- Single Flemish Bond
 - Double Flemish Bond
 - English Bond
 - Zig Zag Bond
72. Dextrine is
- Animal glue
 - Starch glue
 - Albumin glue
 - Rubber based adhesive

73. Stones used for ornamental work should be
- Soft
 - Hard
 - Light
 - Heavy
74. The normal curing period for lime mortar is
- 1 day
 - 3 days
 - 7 days
 - 10 days
75. The maximum energy stored at elastic limit of a material is called
- Resilience
 - Modulus of Resilience
 - Bulk Resilience
 - Proof Resilience
76. The length, coefficient of thermal expansion and Young's modulus of bar 'A' are twice that of bar 'B'. If the temperature of both bars is increased by the same amount while preventing any expansion, then the ratio of stress developed in bar A to that in bar B will be
- 2
 - 4
 - 8
 - 16
77. Consider a machine having a depreciation charge of thirty paise per working hour. The machine has a scrap value of Rs 5,000 and a working hour average life of 36000 hours. What is the purchase price of the machine?
- Rs. 15,800
 - Rs. 5,000
 - Rs. 10,800
 - Cannot be determined based on the given data
78. Rapid hardening cement attains early strength due to
- Larger proportion of lime grounded finer than normal cement
 - Lesser proportion of lime grounded finer than normal cement
 - Larger proportion of lime grounded coarser than normal cement
 - Lesser proportion of lime grounded coarser than normal cement
79. Which is the timber having maximum resistance against white ants?
- Chir
 - Shisham
 - Sal
 - Teak
80. A composite system where the components are of equal lengths is subjected to temperature rise. Which one of the following stresses will be developed in the component having highest coefficient of linear expansion?
- Compressive stress
 - Tensile stress
 - Shear stress
 - Zero stress

81. The age of a tree can be determined from
- The radius of its stem
 - The circumference of its stem
 - The number of its branches
 - The number of its annual rings
82. The stress necessary to initiate yielding is significantly
- Higher than that necessary to continue the same
 - Lesser than that necessary to continue the same
 - Higher than that necessary to stop the same
 - Lesser than that necessary to stop the same
83. Fill the blank: A constant angle arch dam utilizes only _____ of concrete when compared to a constant radius arch dam.
- 13%
 - 43%
 - 73%
 - 103%
84. The radius of gyration of the water line of a floating ship is 4 m and its metacentric height is 72.5 cm. The period of oscillation of the ship, is
- n
 - 2n
 - 3n
 - 4n
85. $\text{N} - \text{s}/\text{m}^2$ is used in S.I. system for
- Mass density
 - Weight density
 - Kinematic viscosity
 - Dynamic viscosity
86. The method of forepoling in tunneling is generally used when the
- Ground is soft
 - Ground is firm
 - Ground is running
 - None of the above
87. Beaufort scale is used to determine
- The strength of winds
 - The direction of winds
 - The pollution level in the wind
 - None of the above
88. In stone masonry, let the stones be so placed that their layers are parallel to the direction of load. Then
- The stones split easily
 - The stones are affected by moisture
 - Both a and b
 - Neither a nor b
89. What does the confining pressure used in triaxial compression tests on an undisturbed soil sample represent
- The in – situ total normal stress
 - The in – situ shear stress

- c. The in – situ average effective principal stress
 - d. The in – situ total lateral stress \$
90. A mild steel flat subjected to a tensile force of 84 tonnes is connected to a gusset plate using rivets. The forces required to shear a single rivet, to crush the rivet and to tear the plate per pitch length are 5000 kg, 8000 kg and 6000 kg respectively. Given this data, how many rivets are then required?
- a. 12
 - b. 14
 - c. 16
 - d. 17 \$
91. The allowable length of an offset depends upon the
- a. Degree of accuracy required
 - b. Scale of plotting
 - c. method of setting out the perpendiculars and nature of ground
 - d. All of the above \$
92. Which of the following represents the upstream slope of an earth dam under steady seepage condition?
- a. Flow line
 - b. Seepage line
 - c. Equipotential line\$
 - d. None of these
93. For accurate work, the steel band should always be used in preference to chain because the steel band
- a. Is lighter than the chain
 - b. Is easier to handle
 - c. Can be easily repaired in the field
 - d. Is practically inextensible and is not liable to kinks when in use \$
94. According to ICAO recommendations, what is the rate of elevation correction for the runway above MSL?
- a. 1% for every 100 m of elevation above MSL
 - b. 2% for every 300 m of elevation above MSL
 - c. 2% for every 500 m of elevation above MSL
 - d. 7% for every 300 m of elevation above MSL \$
95. Calcium lignosulphonate acts as a
- a. Water enhancer
 - b. Water reducer \$
 - c. Sulphur reducer
 - d. None of the above
96. Which factors influence the workability of concrete without sacrificing strength?
- a. Fine aggregate only
 - b. Quantity of mixing water only
 - c. Fine aggregate and Quantity of mixing water
 - d. Maximum size of coarse aggregate and shape of coarse aggregate \$
97. The moisture content of timber used in building frames can be
- a. 2% to 5%
 - b. 8% to 12 % \$
 - c. 12 % to 18%
 - d. Greater than 20%

98. The exterior angle between outer faces of a wall, is as

- a. Turn
- b. Junction
- c. Quion \$
- d. All of the above

99. The compacting factor test of cement concrete determines its

- a. Strength
- b. Porosity
- c. Workability \$
- d. Degree of compaction under loads

100. Consider the following statements:

- 1. An ascending gradient of 1 in 100 meets an ascending gradient of 1 in 120 to form a Valley curve.
- 2. A falling gradient of 1 in 25 meets a falling gradient of 1 in 50 to form a summit curve.
- 3. The length of summit curve is determined on the basis of head light sight distance.

Which one of the statements given above is/are correct?

- a. 1 and 2
- b. 1 and 3
- c. 2 and 3 \$
- d. 1, 2 and 3