

Q. Booklet Sl. No. : 05641

ENTRANCE TEST FOR DIPLOMA HOLDERS – 2011
COURSE : CIVIL ENGINEERING

GROUP CODE : CE

VERSION CODE

A

Maximum Marks : 180

Maximum Time : 205 Minutes

(Including initial 25 minutes for filling Name, Admission Ticket No., Version Code and Serial Number in the OMR Answer Sheet and Question Booklet.)

Please fill your Admission Ticket No. Below

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INSTRUCTIONS TO CANDIDATES

1. Do not remove the seal on the right side of this booklet during the first fifteen minutes after the 2nd bell at 2.00 P.M. You should not look inside the Question Booklet or start answering on the Answer Sheet during initial 10 minutes. Break the seal at the right side to open this booklet only after the 3rd bell at 2.10 P.M.
2. The initial fifteen minutes are meant for the candidates to enter Name, Admission Ticket No., Version code (should be shaded) and Serial No. on the Answer Sheet. As Answer Sheets are designed to suit the Optical Marks Reader (OMR) system, special care should be taken to fill those items accurately. **DO NOT DAMAGE OR MUTILATE THE TIMING MARKS ON THE OMR ANSWER SHEETS.**
3. The Question Booklet and OMR Answer Sheet are issued separately at the start of the examination.
4. This Question Booklet contains 180 questions, check whether 180 multiple choice questions are printed (40 in Applied Science, 40 in Applied Mathematics and 100 questions in Engineering Subject).
5. **Candidate must ensure that he/she has received the correct Question Booklet, corresponding to his/her branch of Engineering/Technology (Group code).**
6. **In case of any discrepancy, immediately exchange the Question Booklet by bringing the error to the notice of the Invigilator.**
7. During the subsequent 180 minutes :
 - (a) Read each question carefully.
 - (b) Determine the correct answer from the four available choices given under each question.
 - (c) **Completely darken/shade the relevant circle with a blue or black ink ballpoint pen against the question number on the Answer Sheet.**

For Example :

Q. No. 14 : The product of 0.5×0.05 is : (1) 0.05, (2) 0.005 (3) 0.025 (4) 0.25
As the correct answer is Option No. 3, the candidate should darken the circle corresponding to Option No. 3 completely with a blue or black ink ballpoint pen on the Answer Sheet.

① ② ● ④

8. Please stop writing when the last bell rings at 5.10 P.M. Hand over answer paper set to the invigilator who will separate top sheet and will retain the same with him and return the bottom sheet replica to you to carry home.

A

1. A body of mass 1 kg whirled round in a circle of diameter 9 m with a velocity of 3 m/s then the centripetal force on it is
- (1) 27 N (2) 3 N
(3) 2 N (4) 1 N
2. The relation between angular velocity (ω) and inner velocity (v) is
- (1) $\omega = r \cdot v$ (2) $v = r \cdot \omega$
(3) $v^2 = r \cdot \omega$ (4) $\omega^2 = r \cdot v$
3. The gravitational constant is equal to
- (1) $6.67 \times 10^{11} \text{ N} - \text{m}^2/\text{kg}^2$
(2) $6.67 \times 10^{-11} \text{ N} - \text{m}^2/\text{kg}^2$
(3) $66.7 \times 10^{-11} \text{ N} - \text{m}^2/\text{kg}^2$
(4) $66.7 \times 10^{11} \text{ N} - \text{m}^2/\text{kg}^2$
4. Acceleration due to gravity decreases as the height
- (1) decreases (2) increases
(3) becomes zero (4) None
5. The escape velocity of satellite is
- (1) 1.12 km/sc (2) 112.2 km/s
(3) 11.2 km/s (4) 1.122 km/s
6. The expression connecting force, displacement and work is
- (1) $W = \frac{S}{F}$ (2) $F = SW$
(3) $F = \frac{W}{S}$ (4) $W = \frac{F}{S}$

7. If the velocity of a body is doubled, then its K.E.
- (1) becomes twice (2) becomes half
(3) remains same ~~(4) increases by four times~~
8. Energy required to lift 100 kg mass through a height of 1 m is
- (1) 0.098 kJ ~~(2) 0.98 kJ~~
(3) 98 kJ (4) 9.8 kJ
9. The resultant of two forces P, Q acting at 90° to each other is
- (1) $P + Q$ (2) $P - Q$
~~(3) $\sqrt{P^2 + Q^2}$~~ (4) $\sqrt{P^2 - Q^2}$
10. Moment of a force is positive if the body move in
- (1) Parallel Direction ~~(2) Anticlockwise Direction~~
(3) Perpendicular Direction (4) Clockwise Direction
11. The algebraic sum of moment of force about any point in their plane is
- (1) more than zero
(2) less than zero
(3) equal to their resultant
~~(4) equal to moment of their resultant about the same point~~
12. A vector is completely described by
- (1) Its magnitude (2) Its direction
~~(3) Its magnitude and direction~~ (4) Neither magnitude nor direction
13. The power developed when a constant couple of 50 Nm. rotates a shaft at 120 rpm is
- (1) 62.8 kW (2) 628 kW
(3) 6.28 kW ~~(4) 0.628 kW~~

14. The relation between Celsius and Fahrenheit scale is

- (1) $C = (9/5)(F - 32)$ (2) $F = (9C/5) + 32$
~~(3) $C = (5/9)(F - 32)$~~ (4) $F = (9C / 5) - 32$

15. The following is not the application convention :

- (1) Land and sea breeze (2) Ventilators
(3) Cooling system in automobiles ~~(4) Davy's safety lamp~~

16. Fastest mode of transfer of heat is

- (1) Conduction (2) Convection
~~(3) Radiation~~ (4) Transmission

17. The temperature of the gas is 300 K at a pressure keeping volume constant the pressure is increased 4 times, its new temperature is

- (1) 720 °K (2) 1200 °C
~~(3) 1200 °K~~ (4) 720 °C

18. Bicycle chain is an example for

- ~~(1) Tensile strain~~ (2) Volume strain
(3) Shear strain (4) Compressive strain

19. When small piece of camphor is dropped into water, the piece move randomly because of

- (1) increase in surface tension ~~(2) decrease in surface tension~~
(3) constant surface tension (4) zero surface tension

20. The SI unit of co-efficient of viscosity is

- ~~(1) $\frac{Ns}{m^2}$~~ (2) $\frac{Nm^2}{s}$
(3) $\frac{Ns}{m}$ (4) $\frac{Nm}{s}$

21. A wire of stress 650 N/m^2 with an area of cross section of wire is 500 m^2 the maximum force that the wire can withstand is
- (1) $325 \times 10^{10} \text{ N}$ ~~(2)~~ $3.25 \times 10^5 \text{ N}$
 (3) $3.25 \times 10^{11} \text{ N}$ (4) $3.25 \times 10^9 \text{ N}$
22. Water rises to a height of 4 cm in a capillary tube. If the radius is reduced to half, the water rises to a height of
- (1) 2 cm (2) 4 cm
 (3) 6 cm ~~(4)~~ 8 cm
23. The maximum displacement of the vibrating body from its mean position is
- ~~(1)~~ Amplitude (2) Frequency
 (3) Oscillation (4) Period
24. Distance between a node and antinode is
- (1) λ (2) $\frac{\lambda}{2}$
 (3) $\frac{\lambda}{3}$ ~~(4)~~ $\frac{\lambda}{4}$
25. The super-position of two waves with nearly same frequency and same amplitude constitute
- (1) Resonance ~~(2)~~ Beats
 (3) Interference (4) Polarisation
26. The minimum distance between sound & reflecting surface to observe echo is
- (1) 17 km ~~(2)~~ 17 m
 (3) 70 km (4) 70 m
27. Acceleration of a body performing SHM is maximum at
- (1) left extreme position (2) right extreme position
 (3) both (1) and (2) ~~(4)~~ at mean position

28. A wave of frequency 600 MHz travels at a speed of 3×10^8 m/s. Its wavelength is
- (1) 2 cm ~~(2)~~ 0.5 m
(3) 0.5 cm (4) 2 m
29. In an auditorium of volume 4500 m^3 , the total reflecting surface is 1200 m^2 . If the average absorption coefficient is 0.4, then the reverberation time is
- (1) 1.6 sec (2) 1 sec
~~(3)~~ 1.5 sec (4) 2 sec
30. The positively charged ions produced during electrolytic dissociation are called
- (1) Anions ~~(2)~~ Cations
(3) Electrons (4) Protons
31. The process of deposition of thin layer of metal over the surface of another metal is called
- (1) Electrolysis (2) Extraction of metals
~~(3)~~ Electroplating (4) Refining
32. The mass of copper deposited on the cathode of a copper voltameter by a current of 2 amps in 30 mins is (given e.c.e. of copper = 0.0003 gm / coulomb)
- (1) 1.08 kg ~~(2)~~ 1.08 g
(3) 18 kg (4) 18 g
33. Which of the following has the pH value greater than 7?
- (1) Blood (2) Sea water
(3) Ammonium Hydroxide ~~(4)~~ All

34. A scale divided into half mm and having a vernier containing 20 divisions has a LC of
(1) 0.01 cm (2) 0.05 cm
(3) 0.025 cm ~~(4) 0.0025 cm~~
35. The prefix 10^{-9} stands for
(1) Tera ~~(2) Nano~~
(3) Mega (4) Giga
36. The dimension formula for surface tension is
~~(1) $[ML^0 T^{-2}]$~~ (2) $[ML^{-1} T^{-2}]$
(3) $[ML^2 T^2]$ (4) $[M^0 L T^{-2}]$
37. The value of acceleration due to gravity in S.I. unit is
(1) 980 dynes (2) 980 Newtons
(3) 9.8 dynes ~~(4) 9.8 m/s²~~
38. A 8 N force acting on a 4 kg mass can impart to it an acceleration of
~~(1) 2 m/s²~~ (2) 4 m/s²
(3) 32 m/s² (4) $\frac{1}{2}$ m/s²
39. The product of mass and velocity of a body is
(1) Force (2) Impulse
~~(3) Momentum~~ (4) Work
40. Recoil of a gun is an example for Newton's
(1) First Law (2) Second Law
~~(3) Third Law~~ (4) None

41. Error due to non-verticality of the levelling staff is

- (1) $AB(\sec \theta - 1)$ (2) $AB(1 - \sec \theta)$
 (3) $AB\left(\frac{1}{\sec \theta} - 1\right)$ (4) $AB(\sec \theta + 1)$

Where A = foot of the staff

B = intersecting pt on the staff by line of sight

42. Abney level is used for measuring

- (1) Slope of the ground surface
 (2) Volume of the ground area
 (3) Area of the ground surface
 (4) Difference in elevations of the points

43. The prismoidal formula for the volume is

- (1) $V = \frac{D}{6}(A_1 + 2Am + A_2)$ (2) $V = \frac{D}{3}(A_1 + 2Am + A_2)$
 (3) $V = \frac{D}{6}(A_1 + 4Am + A_2)$ (4) $V = \frac{D}{3}(A_1 + 4Am + A_2)$

Where D = Distance between end sections (1) & (2).

44. If the radius of the circular arc is 100 m, deflection angle is 90° , the length of the backward tangent is

- (1) 200 (2) 70.70 m
 (3) ∞ (4) 100 m

45. Moment of inertia of a triangular section of base (b) and height (h) about an axis passing through its C.G. and parallel to the base is

- (1) $\frac{bh^3}{4}$ (2) $\frac{bh^3}{8}$
 (3) $\frac{bh^3}{12}$ (4) $\frac{bh^3}{36}$

46. A bar of length 'L' metres extends by 'l' mm under a tensile force of 'p' newtons the strain produced in the bar is
- (1) $\frac{l}{L}$ (2) $\frac{0.1 l}{L}$
 (3) $0.001 \frac{l}{L}$ (4) $0.01 \frac{l}{L}$
47. When a bar of length (l), width (b) and thickness (t) is subjected to a pull of (p) newtons its
- (1) length, width, thickness increases.
 (2) length increases and width, thickness decreases.
 (3) length, width, thickness decreases.
 (4) None
48. The total strain energy stored in a body is termed as
- (1) Resilience (2) Proof resilience
 (3) Impact energy (4) Modulus of resilience
49. The bending moment at the free end of a cantilever beam is
- (1) Zero (2) Minimum
 (3) Maximum (4) Infinite
50. The maximum bending moment of a simply supported beam of span (l) and carrying a point load (w) at the centre of the beam is
- (1) $\frac{wl}{4}$ (2) $\frac{wl}{2}$
 (3) wl (4) $\frac{wl^2}{4}$
51. The point of contraflexure occurs in
- (1) Cantilever beams (2) Over hanging beams
 (3) Simply supported beam (4) Fixed beams

52. The section modulus of a rectangular section about an axis through its C.G. is

(1) $\frac{bd}{2}$

(2) $\frac{bd^3}{12}$

(3) $\frac{bd^2}{2}$

~~(4) $\frac{bd^2}{6}$~~

53. The neutral axis of a beam is subjected to _____ stress.

~~(1) zero~~

(2) maximum tensile

(3) minimum tensile

(4) maximum compressive

54. The maximum deflection of a cantilever beam of length (l) with udl 'w' per unit length is

(1) $\frac{wl^4}{3EI}$

~~(2) $\frac{wl^4}{8EI}$~~

(3) $\frac{wl^4}{16EI}$

(4) $\frac{wl^4}{48EI}$

55. The polar moment of inertia of a solid circular shaft of dia (d) is

(1) $\frac{\pi d^3}{16}$

(2) $\frac{\pi d^3}{32}$

~~(3) $\frac{\pi d^4}{32}$~~

(4) $\frac{\pi d^4}{64}$

56. The load at which the column just buckles is known as

(1) Buckling load

(2) Critical load

(3) Crippling load

~~(4) Any one of the above~~

57. When the pressure intensity at a point is more than the local atmospheric pressure, then the difference of these two pressure is called

(1) Negative pressure

(2) Absolute pressure

~~(3) Positive gauge pressure~~

(4) Vacuum pressure

58. The length of the divergent cone in a venturi meter is _____ that of the convergent one.
- (1) equal to
(2) three to four times
(3) double
(4) half
59. The theoretical velocity of jet at vena contracta is
- (1) $2gH$
(2) $H\sqrt{2g}$
(3) $2g\sqrt{H}$
(4) $\sqrt{2gH}$
60. The loss of head at entrance in a pipe is
- (1) $\frac{0.5V^2}{2g}$
(2) $\frac{V^2}{2g}$
(3) $\frac{0.375V^2}{2g}$
(4) $\frac{0.75^2}{2g}$
61. The discharge over a right angled notch is
- (1) $\frac{8}{15} C_d \sqrt{2g} H^{2/3}$
(2) $\frac{8}{15} C_d \sqrt{2g} H^{3/2}$
(3) $\frac{8}{15} C_d \sqrt{2g} H^{2/5}$
(4) $\frac{8}{15} C_d \sqrt{2g} H^{5/2}$
62. A weir is said to be broad crested, if the width of crest of the weir is _____ half the height of water about the weir crest.
- (1) equal to
(2) less than
(3) more than
(4) one
63. A weir generally used as a spill way of a dam is
- (1) Ogee weir
(2) Narrow crested weir
(3) Broad crested weir
(4) Submerged weir
64. Two theodolite method of setting out a curve involves
- (1) linear measurements only
(2) angular measurements only
(3) both linear and angular measurements
(4) none of the above

65. The most economical section of a trapezoidal channel is one which has hydraulic mean depth equal to

- (1) $\frac{1}{2}$ depth (2) $\frac{1}{2}$ breadth
(3) $\frac{1}{2}$ sloping side (4) $\frac{1}{3}$ depth

66. If the depth of water in an open channel is less than the critical depth, the flow is called

- (1) Critical flow (2) Turbulent flow
(3) Tranquil flow (4) ~~Torrential flow~~

67. In a reciprocating pump, air vessels are used to

- (1) Smoothen the flow (2) ~~Obtain uniform discharge~~
(3) Reduce section head (4) Increase delivery head

68. Which of the following pump is suitable for small discharge and high heads ?

- (1) Centrifugal pump (2) Axial flow pump
(3) ~~Reciprocating pump~~ (4) Mixed flow pump

69. 'TMC' is a measure of

- (1) Velocity (2) ~~Volume of water~~
(3) Water spread area (4) Catchment area

70. A crop requires 1.2 m of water for a base period of 100 days, then the duty of water is

- (1) 864 Hect/Cumec (2) 820 Hect/Cumec
(3) 560 Hect/Cumec (4) ~~720 Hect/Cumec~~

71. Ryve's formula for the estimation of maximum flood discharge is given by

- (1) ~~$CA^{2/3}$~~ (2) $CA^{4/3}$
(3) $CA^{1/2}$ (4) $CA^{3/4}$

72. In case of Isohyetal method, the average rainfall over the catchment area can be found out by using

$$(1) \quad p = \frac{\sum \left(\frac{P_1 + P_2}{2} \right) A_i}{\sum A}$$

$$(2) \quad p = \frac{\sum P}{n}$$

$$(3) \quad p = \frac{\sum A_i P_i}{\sum A}$$

$$(4) \quad \frac{\sum (P_i + A_i)}{\sum A}$$

73. Base width of the elementary profile of the gravity dam is equal to

$$(1) \quad \frac{h}{\sqrt{\rho}}$$

$$(2) \quad \frac{h}{\sqrt{\rho + 1}}$$

$$(3) \quad \frac{h + 1}{\sqrt{\rho}}$$

$$(4) \quad \frac{h}{\rho}$$

h = height of water

ρ = Sp. Gr. of Masonry

74. When a drain flows below a canal such that its HFL touches the underside of the supporting structure, the structure is known as

(1) Aqueduct

(2) Super passage

(3) Syphon Aqueduct

(4) Canal syphon

75. 'Silt excluder' is constructed on

(1) Bed of the canal

(2) Bed of the river

(3) Bank of the river

(4) None of these

76. A canal which irrigates only on one side is known as

(1) Branch canal

(2) Contour canal

(3) Ridge canal

(4) Main canal

77. In R.C.C. column, the cross sectional area of steel bar is A_t and that of concrete is A_c , the equivalent area of the section in terms of concrete is

- (1) $A_t + MAC$ (2) $A_t - MAC$
~~(3) $A_c + mA_t$~~ (4) $A_c - mA_t$

Where m = Modular Ratio

78. The Neutral axis of a balanced section is called

- (1) Balanced N - A ~~(2) Critical N - A~~
 (3) Equivalent N - A (4) Central Axis

79. In a cantilever slab, steel reinforcement are provided at

- ~~(1) Top of the section~~ (2) Bottom
 (3) Mid section (4) The N - A

80. If the thickness of the plate is 't' gross diameter 'd' and the maximum permissible stress in bearing is ' f_b ', then the strength of the rivetted joint against bearing/pitch length

- (1) $(p - d) t f_b$ (2) $ndt f_t$
 (3) $\frac{\pi d^2}{4} \times t \times f_b$ ~~(4) $ndt f_b$~~

81. A fillet weld is known as standard fillet held when its cross-section is

- (1) Square (2) Circular
~~(3) 45° isosceles triangles~~ (4) 30° & 60° triangle

82. In case of gravity dam, for no tension to develop on upstream face of the dam, the resultant of water pressure and weight of dam should not action

- ~~(1) Middle 1/3 of the base of the dam~~
 (2) Inner 1/3 of the base of the dam
 (3) Outer 1/3 of the base of the dam
 (4) Centre of the dam

83. The effective length of a double angle strut with angles placed back to back and connected to both sides of a gusset plate by not less than two rivets is

(1) $0.5 L$

(2) $0.67 L$

(3) $0.85 L$

(4) L

84. 'CTD' bars means

(1) Cross-twisted deformed bars

 (2) Cold twisted deformed bars

(3) Cross turning deformed bars

(4) Cold-twisted disturbed bars

85. In R.C.C. structural design the modular ratio is calculated by using the expression

(1) $m = \frac{280}{30 \sigma_c bc}$

(2) $m = \frac{180}{3 \sigma_c bc}$

(3) $m = \frac{570}{3 \sigma_c bc}$

(4) $m = \frac{380}{3 \sigma_c bc}$

86. The assumed over all depth of T-Beam is taken as _____ of the span when it is simply supported at ends.

(1) $\frac{1}{10}$ to $\frac{1}{12}$

(2) $\frac{1}{12}$ to $\frac{1}{15}$

(3) $\frac{1}{15}$ to $\frac{1}{20}$

(4) $\frac{1}{20}$ to $\frac{1}{25}$

87. The presence of calcium and magnesium chloride in water causes

(1) Softening

 (2) Hardness

(3) Bad taste

(4) Turbidity

88. The maximum permissible turbidity for domestic supplies on silica scale is
- (1) 5 to 10 PPM (2) 10 to 20 PPM
(3) 20 to 30 PPM (4) 30 to 40 PPM
89. An arrangement of back washing is provided in
- (1) Slow sand filter (2) Sedimentation tank
(3) Co-agulation unit (4) Rapid sand filter
90. In order to control the flow of water through pipes a _____ is provided.
- (1) Scour value (2) Safety value
(3) Air value (4) Gate value
91. If the hydraulic mean depth of a circular sewer running half full is 75 mm. Its diameter is
- (1) 150 mm (2) 180 mm
(3) 600 mm (4) 300 mm
92. The sewage is treated by dual action of bacteria and fungi in
- (1) Settling tank (2) Trickling filter
(3) Oxidation pond (4) Imoft cone
93. The unit of measuring the level of sound is
- (1) Stoke (2) Poise
(3) Decibel (4) Pascal
94. In high rate activated sludge treatment, bacteria are removed from
- (1) 20 to 40% (2) 40 to 80%
(3) 60 to 80% (4) 80 to 95%

95. The rate of flow of sewage in a circular sewer is given by
- (1) $Q = AC \sqrt{mi}$ (2) $Q = C \sqrt{mi}$
- (3) $Q = AC \sqrt{\frac{d}{4} \times i}$ (4) Both (1) and (3)
96. Disinfection is the process of
- (1) Removing the colloidal impurities.
- (2) Killing only pathogenic bacteria.
- (3) Removing the settleable impurities.
- (4) Removing the dissolved impurities.
97. _____ is provided between the straight to a curved path for smooth change in direction of vehicle.
- (1) Simple curve (2) Reverse curve
- (3) Transition curve (4) None of the above
98. As per IRC, the Ruling design speed on NH in plain terrain be
- (1) 80 kmph (2) 100 kmph
- (3) 50 kmph (4) 40 kmph
99. Which type of camber is preferred for cement concrete road pavement ?
- (1) Parabolic (2) Elliptical
- (3) Straight line (4) Composite
100. The impact test is performed on road aggregate to evaluate _____.
- (1) Hardness (2) Soundness
- (3) Strength (4) Toughness

101. The raised platforms of suitable shapes built on the road intersection is called

- (1) Traffic signal (2) Traffic signs
 (3) Traffic island (4) Traffic device

102. The triangular portion on upstream side of the pier is called

- (1) Ease water (2) Cutwater
(3) Deck (4) Free board

103. The length of rail for broad gauge track is

- (1) 10.97 M (2) 11.89 M
 (3) 12.80 M (4) 30 M

104. The maximum degree of curvature of horizontal curve for BG should be

- (1) 10 degree (2) 5 degree
(3) 15 degree (4) 20 degree

105. Fore poling method is generally adopted for tunnelling in

- (1) Soft Ground (2) Firm Ground
 (3) Running Ground (4) None of the above

106. _____ is used to divert the railway vehicle from one track to another track.

- (1) Switch (2) Check Rails
(3) Turn table (4) None of the above

107. _____ having great fire resistive value.

- (1) Timber Structure (2) Stone Structure
 (3) Brick Masonry (4) Steel Structure

108. Wedge shaped arch stone units forming the arch are called

- (1) Key stones (2) Skew backs
 (3) Voussoirs (4) Crown

109. Ventilation means

- (1) Cooling the air
(2) Heating the air
 (3) Supply of fresh air into an enclosed space
(4) None of the above

110. The pointing is provided for _____.

- (1) Preventing the dampness
(2) Magnifies appearance
 (3) Both (1) and (2)
(4) None of the above

111. The vertical members fixed between steps and hand rail are known as

- (1) Soffits (2) Strings
 (3) Balusters (4) Navel Post

112. For constructing 100 mm thick partition wall it is preferable to use

- (1) Garden bond (2) Stretcher bond
(3) Header bond (4) Flemish bond

113. The vertical member of a frame which subdivided a window and a door vertically is called

- (1) Port (2) Styles
(3) Reveals (4) Mullion

114. The roof formed by four sloping surfaces in four directions is called
(1) Gabe roof ~~(2) Hip roof~~
(3) Lean to roof (4) None of the above
115. The covering brick placed on the exposed top of a wall to prevent seepage of water is called
~~(1) Coping~~ (2) Cornice
(3) Corbel (4) Reveals
116. _____ consisting of thick RCC slab covering the entire area of bottom of the structure.
(1) Well foundation (2) Shallow foundation
(3) Pile foundation ~~(4) Raft foundation~~
117. Bar chart is drawn for
(1) Time versus time (2) Activity versus resources
(3) Resources versus Progress ~~(4) Progress versus time~~
118. PERT technique of network analysis is mainly useful for
(1) Small project
(2) Large and complex project
~~(3) Research and development project~~
(4) Deterministic activities
119. A contract in which the contractor undertake the construction work and completes it in all respect for a fixed amount of money is termed as
(1) Item rate contract (2) Percentage contract
~~(3) Lumpsum contract~~ (4) Piece work contract
120. In Karnataka Public Works Department, an executive engineer may have financial power for tendering the work up to
(1) 2 lakhs ~~(2) 10 lakhs~~
(3) 50 lakhs (4) None of the above

121. A limestone containing about 30% of alumina and silica is called
- (1) Granular limestone
 - (2) Compact limestone
 - (3) Magnesium limestone
 - (4) Kankar

122. The compressive strength of granite is
- (1) 50 to 70 MN/m²
 - (2) 70 to 130 MN/m²
 - (3) 130 to 170 MN/m²
 - (4) 170 to 200 MN/m²

123. Efflorescence is caused if
- (1) The alkaline salt is present in the bricks.
 - (2) The clay used for making bricks contains pyrite.
 - (3) The water used for pugging the clay contains gypsum.
 - (4) All of the above.

124. Which of the following constituent, when present in excess quantity in clay causes the bricks to melt and distort during burning?
- (1) Alumina
 - (2) Silica
 - (3) Lime
 - (4) Alkalies

125. A good building stone is one which does not absorb more than _____ of its weight of water after one day's immersion.
- (1) 5%
 - (2) 10%
 - (3) 6%
 - (4) 25%

126. The compressive strength of paving bricks should not be less than
- (1) 20 MN/m²
 - (2) 30 MN/m²
 - (3) 40 MN/m²
 - (4) 50 MN/m²

127. The dolomite bricks are
- (1) Ordinary bricks
 - (2) Acid refractory bricks
 - (3) Basic refractory bricks
 - (4) Natural refractory bricks

128. Gypsum is added in the manufacture of Portland cement in order to

- (1) shorten the setting time of cement
- (2) lengthen the setting time of cement
- (3) decrease the burning temperature
- (4) decrease the grinding time

129. The initial setting of cement is caused due to

- (1) Dicalcium cement
- (2) Tricalcium silicate
- (3) Tricalcium aluminate
- (4) Tricalcium aluminoferrite

130. The maximum water-cement ratio for durable concrete is

- (1) 0.2
- (2) 0.4
- (3) 0.6
- (4) 0.8

131. In M_{15} grade concrete, the suffix 15 denotes

- (1) Index No. of mixing grade
- (2) Compressive strength in N/mm^2
- (3) Tensile strength in N/mm^2
- (4) No. of days of curing

132. The purpose of seasoning of timber is to

- (1) Change the direction of grains
- (2) Remove voids
- (3) Reduce moisture content
- (4) All of the above

133. In a well conditioned triangle, no angle should be less than

- (1) 30°
- (2) 40°
- (3) 50°
- (4) 60°

134. A tie line in a chain surveying
- (1) Checks the accuracy of the frame work.
 - (2) Enables the surveyor to locate the interior details which are far away from the main chain lines.
 - (3) Fixes up the directions of all other lines.
 - (4) All of the above
135. The index glass in an optical square is
- (1) Wholly silvered
 - (2) Wholly unsilvered
 - (3) 1/4 silvered & 3/4 unsilvered
 - (4) 1/2 silvered & 1/2 unsilvered
136. The magnetic bearing of the Sun at noon is $185^{\circ}20'$ the magnetic declination will be
- (1) $5^{\circ}20'$ east
 - (2) $5^{\circ}20'$ west
 - (3) $5^{\circ}20'$ north
 - (4) $5^{\circ}20'$ south
137. When the whole circle bearing of two line AB & AC are 355° & 30° respectively, then the included angle BAC will be
- (1) 30°
 - (2) 35°
 - (3) 355°
 - (4) 335°
138. In a closed traverse, the sum of the interior angles will be equal to
- (1) $(2n + 4) 90^{\circ}$
 - (2) $(2n - 4) 90^{\circ}$
 - (3) $(2n - 4) 60^{\circ}$
 - (4) $(n - 2) 90^{\circ}$
139. For establishing the instrument station which method is employed in plane table surveying ?
- (1) Radiation
 - (2) Resection
 - (3) Intersection
 - (4) Traversing
140. The Bench mark falling in the belts of the area bound by 1° latitude 1° longitude is known as
- (1) GTS BM
 - (2) Permanent BM
 - (3) Temp. BM
 - (4) Arbitrary BM

141. Write the third term in the expansion of $(x^2 - \frac{1}{x})^5$.

- (1) $-10x^2$
(2) $10x^4$
(3) $-10x^4$
(4) $10x^2$

142. Find coefficient of x^4 in the expansion of $(x^4 + \frac{1}{x^3})^{15}$.

- (1) $15C_5$
(2) $15C_6$
(3) $15C_7$
(4) $15C_8$

143. If $(2 + \sqrt{3})^4 = 97 + 56\sqrt{3}$ find the value of

$$(2 + \sqrt{3})^4 + (2 - \sqrt{3})^4$$

- (1) 194
(2) 97
(3) 306
(4) 82

144. The value of $nc_1 + nc_{n-1} = \underline{\hspace{2cm}}$.

- (1) $\frac{n^2}{4}$
(2) $\frac{n(n-1)}{2}$
(3) $2n$
(4) $\frac{n}{2}$

145. The distance between $(1, -1)$ and $(-1, 1)$ is

- (1) 8
(2) $2\sqrt{2}$
(3) 4
(4) 2

146. The mid point of the line joining the points $(8, 6)$ and $(2, 10)$ is

- (1) $(5, 8)$
(2) $(8, 5)$
(3) $(10, 16)$
(4) $(16, 10)$

147. The y-intercept of the line $3x - 5y + 6 = 0$ is

- (1) -2
(2) $\frac{1}{2}$
(3) $\frac{6}{5}$
(4) $\frac{5}{6}$

148. The centroid of the triangle whose vertices are $(2, 5)$, $(3, -7)$ and $(4, -4)$ is

- (1) $(3, -2)$
(2) $(2, -3)$
(3) $(1, -6)$
(4) $(6, -1)$

149. The radius of the circle

$$x^2 + y^2 + 4x - 6y + 4 = 0 \text{ is}$$

(1) 4

(2) 2

~~(3) 3~~

(4) 6

150. The acute angle between the straight lines $3y - 4x - 2 = 0$ and $x - 7y + 1 = 0$ is

~~(1) $\frac{\pi}{4}$~~

(2) $\frac{\pi}{2}$

(3) $\frac{\pi}{3}$

(4) $\frac{\pi}{6}$

151. Numerical value of $\operatorname{cosec}\left(\frac{5\pi}{3}\right)$ is

(1) $\frac{\sqrt{3}}{2}$

(2) $\frac{-\sqrt{3}}{2}$

~~(3) $\frac{-2}{\sqrt{3}}$~~

(4) $\frac{2}{\sqrt{3}}$

152. $\sin^2(45^\circ + A) + \sin^2(45^\circ - A)$ is equal to

~~(1) 1~~

(2) -1

(3) 0

(4) $\frac{1}{2}$

153. $\tan 75^\circ$ is equal to

(1) $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

~~(2) $\frac{\sqrt{3}+1}{\sqrt{3}-1}$~~

(3) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

(4) $\frac{\sqrt{3}-1}{2\sqrt{2}}$

154. The simplified answer of

$$\frac{\cos 7\theta - \cos 9\theta}{\sin 9\theta + \sin 7\theta} \text{ is}$$

(1) $\cos \theta$

~~(2) $\tan \theta$~~

(3) $\sin \theta$

(4) $\cot \theta$

155. $\sin^{-1}(\cos x)$ is equal to

(1) $x - \frac{\pi}{2}$

(2) $\frac{\pi}{2}$

(3) x

~~(4) $\frac{\pi}{2} - x$~~

156. $\frac{1 + \cos 2A}{\sin 2A}$ is equal to

- (1) $\cot A$
 (3) $\sin A$

- (2) $\tan A$
(4) $\cos A$

157. The angle of elevation of the top of a tower at a distance of 75 m is 60° . The height of the tower is

(1) 37.5 m

(2) $\frac{75}{\sqrt{2}}$ m

(3) $\frac{75}{\sqrt{3}}$ m

(4) $75\sqrt{3}$ m

158. $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right)$ is equal to

(1) $\frac{\pi}{4}$

(2) $\frac{\pi}{3}$

(3) $\frac{\pi}{6}$

(4) $\frac{\pi}{2}$

159. $\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)}{x^2} =$

(1) 2

(2) -2

(3) 1

(4) -1

160. $\frac{d}{dx} (\log_c 3x) =$

(1) $3x$

(2) x

(3) $\frac{1}{x}$

(4) $-3x$

161. If $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then $\frac{dy}{dx}$ is

(1) $-\frac{b^2x}{a^2y}$

(2) $\frac{b^2x}{a^2y}$

(3) $\frac{bx}{ay}$

(4) $\frac{bx^2}{ay^2}$

162. If $y = x^x$, then $\frac{dy}{dx} =$

- (1) $x^x (1 + \log x)$
 (2) $x (1 + \log x)$
 (3) $x^x (1 - \log x)$
 (4) $(1 + \log x)$

163. If $y = a \cos mx + b \sin mx$, then $\frac{d^2y}{dx^2} =$

- (1) m^2y
 (2) my^2
 (3) $-m^2y$
 (4) $-my^2$

164. The equation of normal to the curve $(3x^2 - xy + y^2) = 3$ at $(1, 1)$

- (1) $x - 5y + 4 = 0$
 (2) $x - 5y - 4 = 0$
 (3) $x + 5y + 4 = 0$
 (4) $x + 5y - 4 = 0$

165. Slope of the tangent to the curve $\sqrt{x} + \sqrt{y} = 5$ at $(4, 5)$ is

- (1) $\frac{-5}{2}$
 (2) $\frac{5}{2}$
 (3) $\frac{-\sqrt{5}}{2}$
 (4) $\frac{\sqrt{5}}{2}$

166. The maximum value of the function $x^3 - 18x^2 + 96x$.

- (1) 160
 (2) 60
 (3) $\frac{1}{160}$
 (4) 180

167. $\int \sqrt{1 + \sin 2x} dx$ is equal to

- (1) $\sqrt{x + \cos 2x} + c$
 (2) $\sqrt{x - \cos 2x} + c$
 (3) $\cos x - \sin x + c$
 (4) $-\cos x + \sin x + c$

168. $\int 3 \sin x \cdot \sec^4 x dx$ is

- (1) $\frac{1}{3} \sec^3 x + c$
 (2) $\sec^4 x + c$
 (3) $\sec^3 x + c$
 (4) $\frac{3}{4} \sec^4 x + c$

169. $\int \frac{x^3 \tan^{-1}(x^4)}{1+x^8} dx$ is

(1) $\tan^{-1}(x^4) + c$

(3) $\frac{x^4 \tan^{-1}(x^4)}{4} + c$

(2) $\frac{[\tan^{-1}(x^4)]^2}{8} + c$

(4) $\frac{x^3 [\tan^{-1}(x^4)]^2}{2} + c$

170. $\int x \sin x dx$ is equal to

(1) $-x \cos x + \sin x + c$

(3) $x \sin x - \cos x + c$

(2) $x \cos x + \sin x + c$

(4) $x \sin x + \cos x + c$

171. $\int_0^{\pi} \sin^2 x dx$ is equal to

(1) 0

(3) $\frac{\pi}{4}$

(2) $\frac{\pi}{2}$

(4) π

172. The area bounded by the curve $y = x^2 + 1$, the x -axis and the ordinates at $x = 1$ and $x = 3$ is

(1) $\frac{40}{3}$ sq. units

(3) $\frac{36}{3}$ sq. units

(2) $\frac{26}{3}$ sq. units

(4) $\frac{32}{3}$ sq. units

173. The differential equation of the function $y = \sin mx$ is

(1) $\frac{d^2y}{dx^2} + m^2 = 0$

(3) $\frac{d^2y}{dx^2} - m^2 = 0$

(2) $\frac{d^2y}{dx^2} + m^2y = 0$

(4) $\frac{d^2y}{dx^2} - m^2y = 0$

174. The solution of differential equation $\frac{dy}{dx} + \frac{y}{x} = 0$ is

(1) $xy = c$

(3) $x + y = c$

(2) $\log(xy) = 0$

(4) $\frac{y}{x} = c$

175. If $A = \begin{bmatrix} 1 & a & -b \\ -a & 1 & c \\ b & -c & 1 \end{bmatrix}$,

then $\Delta A =$

(1) $a^2 + b^2 + c^2$

(2) $a^2 - b^2 - c^2$

(3) $1 + a^2 + b^2 + c^2$

(4) $a + b + c + 1$

176. Solve for 'x'

$$5y + 2x + z + 1 = 0$$

$$x + 7y - 6z + 18 = 0$$

$$3y + 6z = 9$$

(1) 1

(2) -1

(3) 2

(4) -2

177. Name the matrix

$$\begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & -4 \\ 3 & 4 & 0 \end{bmatrix}$$

(1) Conjugate

(2) Skew symmetric

(3) Transpose

(4) Singular

178. Find the adjoint by Matrix method.

$$x + y = 3$$

$$x - y = 1$$

(1) $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$

(2) $\begin{bmatrix} 1 & 3 \\ 1 & 1 \end{bmatrix}$

(3) $\begin{bmatrix} 1 & 3 \\ -1 & 1 \end{bmatrix}$

(4) $\begin{bmatrix} -1 & -1 \\ -1 & 1 \end{bmatrix}$

179. Find cofactor of -2 in the square matrix given below :

$$\begin{bmatrix} 2 & 3 & -1 \\ -1 & 0 & 5 \\ 4 & 1 & -2 \end{bmatrix}$$

(1) -5

(2) 0

(3) -1

(4) 3

180. If $\begin{bmatrix} 1 & 0 \\ y & 5 \end{bmatrix} + 2 \begin{bmatrix} x & 0 \\ -1 & -2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ find x, y.

(1) 0, 2

(2) 2, 0

(3) 2, 2

(4) 0, 0

CE

31

Space For Rough Work

A

CE

31

Space For Rough Work

A