01 — CIVIL ENGINEERING
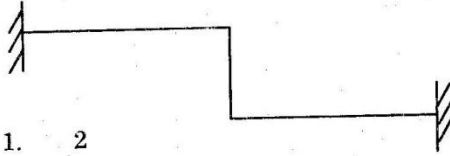
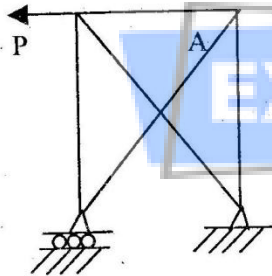## (Answer ALL questions)

56. What is the degree of static indeterminacy of the structure shown below?

    1. 2
    2. 3
    3. 4
    4. 6

57. Effect of lack of fit is only for
    1. Determinate structures
    2. Indeterminate structures
    3. All structures
    4. Flexible structures

58. In a structure shown below the member marked as "A" will be subjected to

    1. Tension
    2. Compression
    3. Bending
    4. Torsion

59. Plastic analysis is advantages for
    1. Determinate structures
    2. Indeterminate structures
    3. Both
    4. Steel structures

60. Post buckling strength is more for
    1. Columns
    2. Plates
    3. Shells
    4. Beams

61. Strain energy due to bending in a cantilever beam subjected to point load "P" at the free end is
    1. $P^2L^3 / 6EI$
    2. $P^2L^3 / 4EI$
    3. $P^2L^3 / 2EI$
    4. P^2L^3 / EI

62. The cylinder strength of concrete is less than the cube strength because of
    1. The difference in the shape of the cross section of the specimens
    2. The difference in the slenderness ratio of the specimens
    3. The friction between the concrete specimens and the steel plate of the testing machine
    4. The cubes are tested without capping but the cylinders are tested with capping

63. Moment redistribution in reinforced concrete beams is
    1. More with higher percentage of reinforcement
    2. Less with higher percentage of reinforcement
    3. Not influenced by the percentage of reinforcement
    4. Not known

64. A wall is called a reinforced concrete wall if the percentage of total compression steel is
    1. > 0.2%
    2. > 0.4%
    3. > 0.6%
    4. > 0.8%

65. If the number of unknown displacement components is greater than the number of compatibility equations then the structure is called
    1. Statically determinate
    2. Statically indeterminate
    3. Kinematically determinate
    4. Kinematically indeterminate

66. For a solid circular rod of diameter D subjected to Torsion T, the maximum shear stress is
    1. $2T/\pi D^3$
    2. $4T/\pi D^3$
    3. $8T/\pi D^3$
    4. $16T/\pi D^3$

67. In a plate girder, the vertical stiffeners are provided at a spacing (d-depth of the girder)
    1. Not greater than 1.5d and not less than 0.3d
    2. Not greater than d and not less than 0.7d
    3. Not greater than 2d and not less than d
    4. Not greater than 5d and not less than 3d

68. For sections where the shear centre and centroid do not coincide will buckle by
    1. Twisting only
    2. Twisting and bending
    3. Bending only
    4. Shear only

69. The portion of a brick obtained by cutting the brick lengthwise into two equal portions is
    1. King closer
    2. Queen closer
    3. Bat
    4. Perpend

70. Composition of CaO in High Alumina Cement varies from
    1. 16 to 20%
    2. 24 to 30%
    3. 36 to 42%
    4. 45 to 52%

71. The measurement of materials for making concrete is known as
    1. Mixing
    2. Batching
    3. Placing
    4. Measuring

72. Buildings longer than ———— are generally provided with one or more expansion joints.
    1. 25 m
    2. 45 m
    3. 65 m
    4. 85 m

73. Vee-Bee Test in concrete is done to measure
    1. Workability
    2. Creep
    3. Segregation
    4. Compaction

74. The strain energy expression for Bending Moment is
    1. $M^2 dx/EI$
    2. Mdx/EI
    3. $M^3 dx/EI$
    4. $M^2/EI\,dx$

75. The difference in slope between any two sections of a loaded flexural member is equal to the area of the M/EI diagram between these two sections
    The above method is
    1. Slope Deflection Method
    2. Conjugate Beam Method
    3. Moment – Area Method
    4. Muller – Breslau Method

76. The critical conditions for stability of saturated clay for foundation loading and excavation are
    1. UU and CD
    2. CD and CU
    3. CD and UU
    4. CU and UU

77. Head loss and number of drops are 6 m and 15 respectively in a flow net. What is the uplift pressure at the end of 10th drop located towards the downstream?
    1. $40\ kN/m^2$
    2. $20\ kN/m^2$
    3. Zero
    4. $30\ kN/m^2$

NG 17 (GROUP A)

78. For isolated spread footings or raft with isolated footings with clear spacing equal or greater than four times the width, the depth of exploration
   1. One and half the times the length
   2. Four and half times the width
   3. One and half the times the width
   4. Three times the width

79. The unconfined compressive strength test are suitable only clay soil because the effective confining pressure is ―――――――
   1. Zero
   2. Negative
   3. Positive
   4. None of the above

80. The limiting values of differential settlement parameters depends on ―――――――
   1. Type of soil
   2. Type of soil and foundation
   3. Type of soil and Dimension of the building
   4. Type of soil, type of foundation and Dimension of the building

81. The installation of bored cast in situ pile in sandy soils are resulting in
   1. Increase of 'ϕ'
   2. Decrease of 'ϕ'
   3. 'ϕ' remains same
   4. Can't say

82. A fully saturated soil is said to be
   1. one phase system
   2. two phase system with soil and air
   3. two phase system with soil and water
   4. three phase system

83. Voids ratio of a soil mass can
   1. never be greater than unity
   2. be zero
   3. take any value greater than zero
   4. take values between 0 and 1 only

84. Sand particles are made of
   1. rock minerals
   2. kaolinite
   3. illite
   4. montmorillonite

85. Dispersed type of soil structure is an arrangement comprising particles having
   1. face to face or parallel orientation
   2. edge to edge orientation
   3. edge to face orientation
   4. all of the above

86. The function of an expansion joint in rigid pavements is to
   1. Relieve warping stresses
   2. Relieve shrinkage stresses
   3. Resist stresses due to expansion
   4. Allow free expansion

87. What is the safe stopping sight distance for design speed of 50 kmph two way traffic on a two lane road assuming co-efficient of friction as 0.37 and reaction time as 2.5 second.
   1. 55.2m
   2. 61.4m
   3. 71.5m
   4. 65.6m

88. The psychological widening on a road of radius 81m and with design speed of 100kmph will be
   1. 10/9m
   2. 6/7m
   3. 11/13m
   4. 9/8m

89. Formula for estimating the number of parking spaces for a car parked in 45 degree parking pattern is
   1. N = L-2.0/ 3.6
   2. N = 2 L-2.6/ 3.8
   3. N = L-2.0/ 8.6
   4. N = 2 L-3.0/ 3.8

90. Minimum width of footpath should be (as recommended by IRC) is
   1. 1 m
   2. 1.5 m
   3. 2.0 m
   4. 2.5 m

91. ESWL is determined based on
   1. equivalent stress criterion only
   2. equivalent deflection criterion only
   3. both 1 and 2
   4. none of the above

92. Runways are designated with numbers calculated
    1. as one tenth of the magnetic azimuth of the runways heading in degrees
    2. as one tenth of the angle the runway heading makes with south
    3. based on direction of wind
    4. based on height above MSL

93. Harbour
    1. is a part of port
    2. contains ports
    3. synonym of port
    4. is used for stocking of goods

94. Composite Sleeper Index of a wooden sleeper is calculated
    1. based on its strength and weight
    2. based on its strength and hardness
    3. based on its hardness and weight
    4. based on its strength and fibre content

95. Higher cant deficiency
    1. Leads to lower unbalanced centrifugal forces
    2. Has no influence on centrifugal forces
    3. Has no influence on passenger comfort
    4. Leads to greater unbalanced centrifugal forces

96. The instrument used for the measurement of wind speed is
    1. Anemometer
    2. Rotameter
    3. Odometer
    4. Atmometer

97. The number of rain gauge required per unit area to give fairly reliable data on rainfall over an area is
    1. Small where rainfall gradient is steep
    2. Large where rainfall gradient is steep
    3. Small for hilly areas
    4. Small for arid region

98. A weir that is not submerged, i.e. in which the tail water is below the crest is called
    1. Free water weir
    2. Free fall weir
    3. Unsubmerged weir
    4. Round crested weir

99. When the allowable stress is f and w is the unit weight of water, the limiting height of low gravity dam is given by
    1. $H = \dfrac{f}{(f+c+w+1)}$
    2. $H = \dfrac{f}{f(c+w+1)}$
    3. $H = \dfrac{f}{c(f+w+1)}$
    4. $H = \dfrac{f}{w(f-c+1)}$

100. The diameter of the cylindrical metal case for a Symon's non-recording rain gauge is
    1. 5.80 cm
    2. 12.70 cm
    3. 20.32 cm
    4. 34.56 cm

101. Which of the following is not a dimensionless number?
    1. Darcy-Weisbach friction factor f
    2. Coefficient of drag CD
    3. Manning's coefficient n
    4. Coefficient of velocity Cv

102. In a rectangular channel if the critical depth is 2 m, the specific energy at critical depth is
    1. 1.5 m
    2. 3 m
    3. 2 m
    4. 2.5 m

103. The following type of gradually varied flow profiles do not exist
    1. C2, H2 and A1
    2. C3, H2 and A2
    3. C2, S1 and A3
    4. C2, H1 and A1

104. A U-tube manometer measures
    1. Difference in pressure between two points
    2. Local atmospheric pressure
    3. Difference in total energy between two points
    4. Absolute pressure at a point

105. The viscosity of
    1. Liquids increases with temperature
    2. Fluids decreases with temperature
    3. Gases increases with temperature
    4. Fluids increases with temperature

106. If Q is discharge is cubicmetres per sec and D is the economical diameter of the pipe in metre. According to Lea
    1. D = 0.67 to 0.87 Q
    2. D = 0.77 to 0.97 Q
    3. D = 0.97 to 1.22 Q
    4. D = 1.22 to 1.33 Q

107. Surge tanks are used
    1. for storage water
    2. to increase the velocity in a pipeline
    3. as overflow valves
    4. to guard against water hammer

108. A sample of mixed liquor was found to have suspended solids (SS) = 4500 mg/L and after settling for 30 minutes in a 1 L cylinder, it occupied 300 mL. The Sludge Volume Index (SVI) is
    1. 150
    2. 67
    3. 75
    4. 217

109. Kyoto Protocol is an international agreement to reduce emission of
    1. Ozone-depleting gases
    2. Green house gases
    3. Gases causing acid rain
    4. Radioactive gases (Radon)

110. A safe level of noise depends on
    1. level of noise and exposure to noise
    2. area
    3. pitch
    4. frequency

111. In the absence of a compass, one of the following instrument can be used to set a line at 45°
    1. Wooden cross staff
    2. French cross staff
    3. Optical square
    4. Prism square

112. Plane table can be oriented at the successive stations with the help of
    1. Alidade
    2. Plumbing fork
    3. Spirit level
    4. Trough compass

113. In isosceles triangles, the ratio of perpendiculars from the vertex on their bases and the bases is constant, will be the basic principle of
    1. Geometry
    2. Photogrammetry
    3. Tacheometry
    4. Trigonometry

114. The precise formula to determine the area of a plot with known corner co-ordinates is
    1. $\frac{1}{2} \sum x_2 (y_2 - y_n)$
    2. $\frac{1}{2} \sum x_1 (y_2 - y_n)$
    3. $\frac{1}{2} \sum x_3 (y_4 - y_{n-1})$
    4. $\frac{1}{2} \sum x_4 (y_3 - y_n)$

115. The carrier wave used in the total station equipment for land surveying is
    1. Infrared wave
    2. Long wave
    3. Microwave
    4. Shortwave

ANSWER SHEET

NG 17

Answer Sheet Number

402513

Name of the Examination Centre ☞

I certify that I have verified the entries, shading of Registration Number, Question Book Number and the Candidate's Signature.

Candidate's Signature

Hall Superintendent's Signature

Seal of the Examination Centre

Instructions to Candidate

1. Use Black Ball point Pen for shading inside the brackets as shown below.

| 1 | ▬ | [2] | [3] | [4] |

2. Ensure your choice before shading.

3. Do not make any stray marks inside the answer brackets as the scanner will treat it as multiple shadings. Handle this sheet with care.

4. Any malpractice committed is punishable as per Anna University norms.

Registration Number

Question Book Number

Part AA and BB are compulsory (Question Numbers 1 To 55). You have to answer the Subject Registered as Printed in the Hall Ticket. Write and shade the Subject Number for answering Question number 56 onwards.

Subject Number

(Digit columns: [1] [2] [3] [4] [5] [6] [7] [8] [9] [0])

Q. No.	Answers	Q. No.	Answers	Q. No.	Answers	Q. No.	Answers
1	[1] [2] [3] [4]	31	[1] [2] [3] [4]	61	[1] [2] [3] [4]	91	[1] [2] [3] [4]
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6	[1] [2] [3] [4]	36	[1] [2] [3] [4]	66	[1] [2] [3] [4]	96	[1] [2] [3] [4]
7	[1] [2] [3] [4]	37	[1] [2] [3] [4]	67	[1] [2] [3] [4]	97	[1] [2] [3] [4]
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