Combined Engineering Services Exam

QCEE

Booklet Series **A**

Register Number

2008

CIVIL ENGINEERING

Time Allowed : 3 Hours] **[Maximum Marks : 300**

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Booklet has a cover (this page) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains **200** questions.
3. Answer **all** questions. **All** questions carry equal marks.
4. The Test Booklet is printed in *four* series *e.g.* [A] [B] [C] or [D] (See Top left side of this page). The candidate has to indicate in the space provided in the Answer Sheet the series of the booklet. For example, if the candidate gets [A] series booklet, he/she has to indicate in the side 2 of the Answer Sheet with Blue or Black Ink Ball point pen as follows :

   [A] ■ [B] [C] [D]

5. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
6. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Register No. and other particulars on side 1 of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
7. You will also encode your Register Number, Subject Code etc., with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, your Answer Sheet will not be evaluated.
8. Each question comprises *four* responses (A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
9. In the Answer Sheet there are **four** brackets [A] [B] [C] and [D] against each question. To answer the questions you are to mark with Ball point pen ONLY ONE bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. *e.g.* If for any item, (B) is the correct answer, you have to mark as follows :

   [A] ■ [C] [D]

10. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
11. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
12. Do not tick-mark or mark the answers in the Question Booklet.
13. The sheet before the last page of the Question Booklet can be used for Rough Work.

Tear here

DO NOT TEAR THIS COVER OF THE QUESTION BOOKLET UNTIL YOU ARE ASKED TO DO SO

Tear here

1. The volume of one bag of cement weighing 50 kg is

   A) 0·04 m^3 B) 0·0345 m^3

   C) 0·025 m^3 D) 0·05 m^3.

2. Sea sand used in structures causes

   A) dampness B) efflorescence

   C) disintegration D) all of these.

3. Le Chatelier's apparatus is used to carry out

   A) Consistency test B) Tensile test

   C) Soundness test D) Compressive strength.

4. The property by virtue of which lime sets under water, is known as

   A) setting B) slacking

   C) hydraulicity D) hydration.

5. The number of standard bricks required for one cubic metre of brick masonry is

   A) 400 B) 500

   C) 425 D) 550.

6. The standard size of masonry bricks is

   A) 180 mm × 80 mm × 80 mm B) 190 mm × 90 mm × 90 mm

   C) 200 mm × 100 mm × 100 mm D) 210 mm × 110 mm × 110 mm.

7. The rock generally used for roofing is

   A) Granite B) Basalt

   C) Slate D) Pumice.

8. The hardest rock is

   A) Marble B) Diamond

   C) Talc D) Quartz.

9. Plastic asphalt is

   A) used as a waterproofing layer over roof

   B) a mixture of cement and asphalt

   C) a natural asphalt

   D) a refinery product.

10. Match **List I** with **List II** correctly and select your answer using the codes given below :

	List I (Stone test)		**List II** (Characteristics)
a)	Acid test	1.	compressive strength
b)	Attrition test	2.	weathering quality
c)	Crushing test	3.	toughness
d)	Impact test	4.	rate of wear.

Codes :

	a	*b*	*c*	*d*
A)	1	2	3	4
B)	3	1	4	2
C)	2	4	1	3
D)	4	3	2	1.

11. The formwork including the props can be removed from beams, only after

A) 3 days B) 7 days

C) 14 days D) 21 days.

12. The quantity of damp-proof course (DPC) is worked in

A) m^3 B) m

C) m^2 D) lumpsum.

13. The brick laid with its length perpendicular to the face of the wall is called as

A) Header B) Stretcher

C) Bond D) Course.

14. The construction of a temporary structure required to support an unsafe structure is called

A) underpinning B) scaffolding

C) shoring D) jacking.

15. Match **List I** with **List II** correctly and select your answer using the codes given below :

List I		List II	
a)	Stretcher bond	1.	The bond containing alternate course of stretchers and headers
b)	Header bond	2.	The bond containing alternately stretchers and headers in each course
c)	English bond	3.	The bond containing all stretchers
d)	Double Flemish bond	4.	The bond containing all headers.

Codes :

	a	*b*	*c*	*d*
A)	1	2	3	4
B)	3	4	1	2
C)	3	1	4	2
D)	4	3	2	1.

16. The painting work is generally specified by
A) weight of the paint applied B) labour used in the painting
C) area of the painted surface D) number of coatings applied.

17. The stone masonry of finely dressed stones laid in cement or lime is
A) random rubble masonry B) coursed rubble masonry
C) dry rubble masonry D) ashlar masonry.

18. Stress may be defined as
A) force per unit length B) force per unit volume
C) force per unit area D) none of these.

19. The vertical members fixed between steps and hand rail are known as
A) balusters B) strings
C) newel posts D) soffits.

20. For providing a raft foundation, the following activities are involved :
I. ramming the foundation bed
II. excavation of the soil upto required depth
III. laying the reinforcement over the foundation bed
IV. cutting the cement concrete placed over reinforcement
V. pouring the cement concrete over the reinforcement.

The correct sequence is
A) I, II, III, IV, V B) V, IV, III, II, I
C) II, I, III, V, IV D) III, II, V, I, IV.

21. Drop arrow is used in

A) conventional chain survey

B) measurements along slopes

C) measurement by method of stepping

D) measuring with tape.

22. In order to measure a horizontal angle more accurately than a vernier, a method of

A) repitition is used B) reiteration is used

C) deflection angle is used D) double observations are used.

23. The length of a long chord in curve setting is equal to

A) $R \sin \phi$ B) $2R \sin \frac{\phi}{2}$

C) $R \cos \phi$ D) $2R \cos \frac{\phi}{2}$

24. The line joining the north and south poles is termed as

A) Magnetic meridian B) True bearing

C) Arbitrary meridian D) None of these.

25. Cumulative positive errors occur in chaining due to

I. length is shorter

II. slope correction is not applied

III. sag correction is not applied

IV. incorrect folding of the chain.

Of the statements

A) (I) alone is correct B) (II) and (III) are correct

C) (I) and (II) are correct D) (I), (II) and (III) are correct.

26. Consider the following statements :

Assertion (A) : Orientation is necessary when the instrument has to be set up at more than one station.

Reason (R) : If it is not oriented, a different meridian will be used at each of the successive stations.

Now select your answer according to the coding scheme given below :

A) Both *(A)* and *(R)* are true, but *(R)* is not the correct explanation of *(A)*

B) *(A)* is true, but *(R)* is false

C) Both *(A)* and *(R)* are true and *(R)* is the correct explanation of *(A)*

D) *(A)* is false, but *(R)* is true.

27. The stations selected on the main survey lines for running auxiliary lines are known as

A) tie line stations B) main survey stations

C) subsidiary stations D) check line stations.

28. The end of the curve where the curve touches the forward tangent is

A) point of intersection B) point of tangency

C) point of curvature D) forward tangent.

29. A method which is used when the staff is too far from the instrument is

A) tangential method B) movable hair method

C) fixed hair method D) tachometric traverse.

30. The instrument attached to the wheel of a vehicle in order to measure the distance travelled is called

A) Pedometer B) Odometer

C) Speedometer D) Passometer.

31. An undertaking by a party, firm or person to do any work under terms and conditions is called as

A) tender B) contract

C) arranging contract D) all of these.

32. On acceptance of the tender, the tenderer has to deposit ..... of the tendered amount on security money inclusive of the money already deposited.

A) 5% B) 10%

C) 15% D) 8%.

33. Depreciated value of a building can be found out by using the formula

A) $D = \left(\frac{100 - rd}{100}\right)^n$ B) $D = P\left(\frac{100 - rd}{100}\right)^n$

C) $D = P\,(\,100 - rd\,)^n$ D) $D = (\,100 - rd\,)^n$.

34. The scrap value is

A) market value B) book value

C) salvage value D) none of these.

35. Schedule of rate is prepared on the basis of

A) design B) calculations

C) analysis of rates D) work.

36. The P. W. D. maintains the book(s)

A) Schedule of Rates B) Road Metal Rate Book

C) either (A) or (B) D) both (A) and (B).

37. Stone masonry is measured in

A) square metres B) cubic metres

C) kilometres D) metres.

38. In the rent fixation, the owner expects about ..... higher interest than the prevalent rate, to cover up the risk of his investment.

A) 2% B) 3%

C) 6% D) 8%.

39. Original estimate has to be revised under the circumstances

A) when original cost is likely to exceed by more than 5%

B) when expenditure is likely to exceed the amount of administrative sanction by more than 10%

C) when there is deviation from the original proposal

D) all of these.

40. Hand rails are measured in

A) square metre B) cubic metre

C) running metre D) all of these.

41. The unit of stress in SI units is

A) N / mm^2 B) kN / mm^2

C) MN / m^2 D) all of these.

42. The ratio of shear stress and shear strain of an elastic material is

A) Modulus of rigidity B) Young's modulus

C) Shear modulus D) Both (A) and (C).

43. Match **List I** with **List II** correctly and select your answer using the codes given below :

	List I		**List II**
a)	Ratio of applied load and area of cross-section of the loaded section	1)	strain
b)	Ratio of the change in length and original length of the loaded section	2)	ultimate stress
c)	Ratio of maximum load and original area of cross-section	3)	Young's modulus of elasticity
d)	Ratio of stress and strain	4)	unit stress.

Codes :

	a	*b*	*c*	*d*
A)	4	1	2	3
B)	1	2	3	4
C)	4	3	2	1
D)	1	3	2	4.

44. The stress at which extension of a material takes place more quickly as compared to the increase in load is called

A) elastic point B) yielding point

C) breaking point D) plastic point.

45. Consider the following statements :

Assertion (A) : For the same shear force, maximum shear stress developed in circular section is lesser than in the rectangular section.

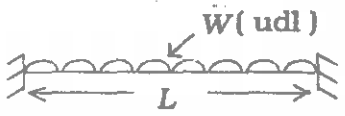
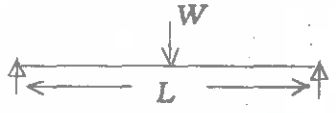
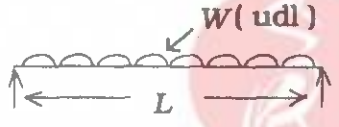
Reason (R) : Circular section is stronger in shear.

Now select your answer according to the coding scheme given below :

A) *(A)* is true, but *(R)* is false B) *(A)* is false, but *(R)* is true.

C) Both *(A)* and *(R)* are false D) Both *(A)* and *(R)* are true.

46. Choose the correct match in the list :

List I (*Loaded member*)		List II (*Maximum deflection*)	
A)		1)	$\frac{5}{384}\frac{WL^3}{EI}$
B)		2)	$\frac{WL^3}{3\,EI}$
C)		3)	$\frac{WL^3}{8\,EI}$
D)		4)	$\frac{WL^3}{48\,EI}$

47. The energy stored in a body when strained within elastic limit is known as
   A) resilience B) proof resilience
   C) impact energy D) strain energy.

48. Failure of a ductile material is best explained by
   A) principal stress criterion B) principal strain criterion
   C) distortion energy criterion D) strain energy criterion.

49. Which of the following methods of structural analysis is a force method ?
   A) Slope deflection method B) Moment distribution method
   C) Column analogy method D) All of these.

50. Consider the following statements :
   I. For short columns, the failure is due to yielding
   II. For short columns, the failure is due to instability
   III. For short columns, the failure is due to yielding and instability
   IV. For short columns, the failure is due to neither yielding nor instability.

   Of the statements
   A) (I) alone is correct B) (I) and (II) are correct
   C) (I), (II) and (III) are correct D) (I) and (IV) are correct.

51. A simply supported beam of span 'l' carries a point load W at mid-span. The maximum bending moment occurs

A) at supports
B) $\frac{2}{3}l$
C) mid-span
D) $\frac{1}{4}l$.

52. A fixed beam of span 'l' carries a point load W at the mid-span. The bending moment at mid-span is given by

A) $\frac{Wl}{4}$
B) $\frac{Wl}{8}$
C) $\frac{Wl^2}{2}$
D) $\frac{Wl}{2}$.

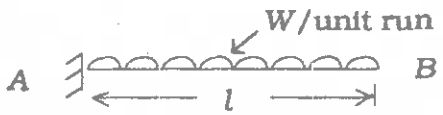
53. In terms of bulk modulus (K) and modulus of rigidity (C), the Poisson's ratio can be expressed as

A) $\frac{3K-4C}{6K+4C}$
B) $\frac{3K+4C}{6K-4C}$
C) $\frac{3K-2C}{6K+2C}$
D) $\frac{3K+2C}{6K-2C}$

54. Beams composed of more than one material, rigidly connected together, so as to behave as one piece are known as

A) compound beams
B) indeterminate beams
C) determinate beams
D) composite beams.

55. The bending moment at the fixed end of a cantilever beam as shown in figure is given by



A) $\frac{Wl}{2}$
B) $\frac{Wl}{4}$
C) $\frac{Wl^2}{2}$
D) Wl^2.

56. The section modules of a rectangular beam section of width 'b' and depth 'd' is given by

A) $\frac{bd^4}{16}$
B) $\frac{b^2d}{6}$
C) $\frac{bd^2}{8}$
D) $\frac{bd^2}{6}$.

57. The Rankine–Gordon formula for the crippling load (P) on a column is given by

A) $\frac{f_c A}{1 + a\frac{l^2}{r^2}}$ B) $\frac{f_c A}{1 - a\frac{l^2}{r^2}}$

C) $\frac{f_c a}{1 - A\frac{l^2}{r^2}}$ D) $\frac{f_c A}{1 + a\frac{r^2}{l^2}}$

58. Eccentrically loaded columns are generally subjected to

A) axial compression and tension

B) shear stress and axial compression

C) bending stress and axial compression

D) bending stress, shear stress and axial compression.

59. The deflection of a beam may be reduced by

A) decreasing the depth of the beam B) increasing the span

C) providing greater end restrains D) any of these methods.

60. Which of the following is demension less ?

A) Bulk modulus B) Strain

C) Shear stress D) Young's modulus.

61. The water content of fully saturated clayey soil depends on its

A) liquid limit B) void ratio

C) plastic limit D) O.M.C.

62. Which one of the following relations is not correct ?

A) $e = \frac{n}{1 - n}$ B) $n = \frac{e}{1 - e}$

C) $e = \frac{\omega G}{S_r}$ D) $\gamma_{Sat} = \frac{(G + e)}{(1 + e)} \cdot \gamma_\omega$

63. A well graded sandy soil containing clay is represented by the symbol, as per I.S. classification,

A) SC B) SW

C) SB D) CB.

64. The standard temperature at which the hydrometer is calibrated is

A) 10°C B) 15°C

C) 20°C D) 25°C.

65. A soil having uniformity coefficient more than 10, is called

A) uniform soil B) poor soil

C) well graded soil D) coarse soil.

66. Relative density of sand indicates

A) density of sand compared with density of water

B) looseness of sand

C) bulk density of sand

D) bulking of sand.

67. The permeability of a given soil is

A) directly proportional to the average grain size

B) inversely proportional to the average grain size

C) directly proportional to the square of the average grain size

D) inversely proportional to the square of the average grain size.

68. Flow net is used to find out

A) the permeability of soil B) the strength of soil

C) the quantity of seepage D) the bearing capacity of soil.

69. Dupit's theory is used to find

A) liquid limit of soil

B) the coefficient of permeability of soil

C) shear strength of soil

D) settlement of soil.

70. Darcy's law is valid only if

A) the flow is laminar B) the flow is turbulent

C) the flow is due to water D) the flow is intermittent.

71. The critical depth of vertical cut in a cohesive soil is given by

A) $\frac{4c}{\gamma}\tan\left(45^\circ + \frac{\phi}{2}\right)$ B) $\frac{2c}{\gamma}\tan\left(45^\circ + \frac{\phi}{2}\right)$

C) $\frac{4c}{\gamma}\cot\left(45^\circ + \frac{\phi}{2}\right)$ D) $\frac{2c}{\gamma}\cot\left(45^\circ + \frac{\phi}{2}\right)$

where c = unit cohesion

ϕ = angle of internal friction

γ = unit weight of soil.

72. Relation among coefficient of consolidation C_v, time factor T_v, drainage path d and time t, is

A) $C_v = \frac{d^2.T_v}{t}$ B) $C_v = \frac{d^2.t}{T_v}$

C) $C_v = \frac{t.T_v}{d^2}$ D) $C_v = \frac{T_v}{t.d^2}$

73. A combined footing is generally used when

A) number of columns is two and they are spaced close to each other

B) number of columns is two and they are spaced far apart

C) number of columns is more than two and they are spaced far apart

D) there is only one column.

74. The Engineering News formula for computing the allowable load carrying capacity of a pile (Q_a), driven through the fall of hammer of weight W, and fall height H cm with steam hammer, giving S cm penetration with the last blow, is given by

A) $Q_a = \frac{WH}{(S + 0{\cdot}25)}$ B) $Q_a = \frac{WH}{6(S + 0{\cdot}25)}$

C) $Q_a = \frac{WH}{(S + 2{\cdot}5)}$ D) $Q_a = \frac{WH}{6(S + 2{\cdot}5)}$

75. Coefficient of earth pressure at rest is given by

A) $\frac{\mu^2}{1 - \mu^2}$ B) $\frac{\mu}{1 - \mu}$

C) $\frac{1 - \mu}{\mu}$ D) $\frac{1 - \mu^2}{\mu^2}$.

76. Mat is shallow foundation supporting
   A) only one column
   B) number of columns in one row
   C) number of columns in more than one row
   D) none of these.

77. Coefficient of consolidation is used for evaluating
   A) time rate of settlement
   B) total settlement
   C) stress in soil
   D) over consolidation ratio.

78. The bearing capacity of a soil may be improved by
   A) reducing the depth of foundation
   B) increasing the depth of foundation
   C) moistening the soil
   D) loosening the soil.

79. Pile foundations are normally used
   A) in soft clayey soils
   B) in heavy loaded situations
   C) when required bearing area is not available
   D) in loose sandy soils.

80. Minimum depth of wall footing is obtained by
   A) Rankine's formula
   B) Mendlin formula
   C) Balla formula
   D) all of these.

81. Slow sand filter is efficient to remove the bacteria from the raw water to an extent of
   A) 50%
   B) 70%
   C) 85%
   D) 99%.

82. The minimum diameter of a manhole opening is
   A) 200 cm
   B) 150 cm
   C) 100 cm
   D) 50 cm.

83. Evaporation from the surface of the reservoir may be reduced by sprinkling
   A) Methane
   B) Spirit
   C) Acetyl alcohol
   D) HCl.

84. Platinum–Cobalt scale is used for measurement of its

A) turbidity B) colour

C) temperature D) solids.

85. Colour of fresh sewage is

A) green B) brown

C) pink D) grey.

86. Which of the following statements is correct ?

A) If the pH value of water is equal to 7, the water is said to be neutral

B) The pH value determines the strength of the acid or alkali in water

C) The pH value of water can be obtained by a potentiometer

D) All of these.

87. The water of a river has an important property called

A) turbidity B) self-purification

C) permeability D) infiltration capacity.

88. Match **List I** with **List II** correctly and select your answer using the codes given below :

List I *(Impurities)*	**List II** *(Process)*
a) Floating matter	1) Filtration
b) Suspended impurities	2) Plain sedimentation
c) Micro-organism and colloid	3) Disinfection
d) Pathogenic bacteria	4) Screening.

Codes :

	a	***b***	***c***	***d***
A)	1	3	2	4
B)	4	2	1	3
C)	4	1	2	3
D)	1	4	3	2.

89. Water carriage system needs more

A) men B) area

C) water D) money.

90. Pollutants in air can be in the form of
A) aerosol B) particulates
C) gases D) any of these.

91. pH value is symbol for ..... concentration.
A) magnesium B) hydrogen
C) calcium D) sodium.

92. From septic tank the effluents are discharged into
A) soakpit B) oxidation pond
C) cesspool D) all of these.

93. Pollution of river or stream is indicated by an increase in
A) acidity B) chloride content
C) oxygen content D) nitrate content.

94. Garbage is a
A) dry waste B) semi-liquid waste
C) liquid waste D) none of these.

95. The bacteria that can survive without oxygen are called
A) facultative bacteria B) anaerobic bacteria
C) aerobic bacteria D) none of these.

96. BOD test is standardized at
A) 10° and 10 days B) 20° and 5 days
C) 37° and 3 days D) 50° and 2 days.

97. The best coagulant for removing the colour of water is
A) alum B) lime
C) iron sulphate D) copper sulphate.

98. The secondary treatment of sewage is carried out by the use of
A) screens B) grit chambers
C) trickling filters D) chlorination.

99. Air pollutant(s) common to urban environment is / are
A) sulphur dioxide B) particulate matter
C) hydrocarbon D) all of these.

100. The liquid waste conveyed by a sewer is known as
A) sullage B) sewerage
C) sewage D) none of these.

101. Reinforced cement concrete is equally strong in taking

A) tensile and compressive stresses

B) tensile and shear stresses

C) compressive and shear stresses

D) tensile, compressive and shear stresses.

102. The process of proper and accurate measurement of all concrete materials for uniformity of proportions and aggregates grading is called

A) proportioning B) grading

C) mixing D) batching.

103. The concrete in which preliminary tests are performed for designing the mix is called

A) rich concrete B) controlled concrete

C) lean concrete D) ordinary concrete.

104. Water–cement ratio is usually expressed in

A) litres of water required per bag of cement

B) litres of water required per kg of cement

C) both (A) and (B)

D) none of these.

105. The levelling operation that removes humps and hollows and gives a true, uniform concrete surface is called

A) screeding B) floating

C) trowelling D) compacting.

106. The constituents of cement which act as binder are

A) sand and silica

B) carbon and silica

C) tricalcium silicate, dicalcium silicate and carbon dioxide

D) tricalcium silicate, dicalcium silicate and tricalcium aluminate.

107. Insufficient quantity of water

A) makes the concrete mix hard

B) makes the concrete mix unworkable

C) both (A) and (B)

D) causes segregation in conerete.

108. The function of aggregates in concrete is to serve as

A) binding material B) filter

C) catalyst D) all of these.

109. For heat and sound insulation purposes, we shall use

A) vacuum concrete B) air-entrained concrete

C) sawdust concrete D) both (A) and (B).

110. The cement concrete in which high compressive stresses are artificially induced before its actual use is called

A) plain cement concrete B) reinforced cement concrete

C) pre-stressed cement concrete D) lime concrete.

111. In R. C. C. beams, the shear reinforcement is provided in the form of

A) vertical stirrups B) bent-up bars along with stirrups

C) inclined stirrups D) all of these.

112. The minimum diameter of bars for a slab is usually

A) 8 mm B) 12 mm

C) 16 mm D) 20 mm.

113. Post-tensioning is common in structures like

A) electric poles B) slabs

C) small water tanks D) bridges.

114. The equation(s) of statics is / are called

A) $\sum H = 0; \sum V = 0$ B) $\sum m = 0$

C) $\sum V = 0$ D) $\sum H = 0; \sum V = 0; \sum m = 0$.

115. The Poisson's ratio for concrete is approximately

A) 0·05 B) 0·10

C) 0·15 D) 0·30

116. The slab which directly rests on columns without the aid of any beam is known as

A) two-way slab B) flat slab

C) ribbed slab D) one-way slab.

117. The depth of neutral axis of a doubly reinforced beam section is given by the equation

A) $\frac{bn^2}{2} + (1{\cdot}25\ m - 1)\ A_c (n - d_c) = m A_t (d - n)$

B) $\frac{bn^2}{2} + (1{\cdot}75\ m - 1)\ A_c (n - d_c) = m A_t (d - n)$

C) $\frac{bn^2}{2} + (1{\cdot}5\ m - 1)\ A_c (n - d_c) = m A_t (d - n)$

D) $\frac{bn^2}{2} + (2\ m - 1)\ A_c (n - d_c) = m A_t (d - n)$.

118. If the preliminary dimensions of the sections are changed relatively, the analysis can be modified fast in

A) Moment distribution method B) Kani's method

C) Double integration method D) None of these.

119. A long vertical member when subjected to axial compression is called

A) Beam B) Column

C) Tie D) Stanchion.

120. The ratio of effective length to least radius of gyration is

A) crippling factor B) slenderness ratio

C) bucking factor D) none of these.

121. The major loss of prestress is caused due to

A) shrinkage of concrete B) slip on anchorage

C) relaxation of steel D) all of these.

122. In concrete, if the reinforcement wires are stretched after the concrete has hardened, it is called

A) post-tensioning B) initial tensioning

C) high tensioning D) pre-tensioning.

123. R. C. C. electric poles are generally made of

A) light weight concrete B) prestressed concrete

C) cold weathering concrete D) quick setting concrete.

124. The diameter of the rivet before rivetting is called

A) nominal diameter B) gross diameter

C) net diameter D) none of these.

125. The radius of gyration of a cased beam is equal to

A) 0·2 (b + 100) mm B) 0·3 (b + 100) mm

C) 0·4 (b + 100) mm D) 0·5 (b + 100) mm

where b = width of the steel beam in mm.

126. Coulomb's earth pressure theory is based on the following assumptions :

I. The backfill is saturated cohesionless soil

II. The position and line of action of the earth pressure are known

III. The sliding wedge is considered to be a rigid body

IV. The failure surface is a continuous non-plane surface.

Of these statements :

A) (II) and (III) are correct B) (II) and (IV) are correct

C) (III) and (IV) are correct D) (I) and (IV) are correct.

127. In the case of an under-reinforced section

A) steel will yield first

B) concrete will yield first

C) steel is provided on the undesirable of the section

D) concrete cover is not provided for reinforcement.

128. The distance between centres or any two adjacent rivets (including tacking rivets) shall not exceed

A) 16 t B) 25 t

C) 32 t D) 35 t

where t = thickness of the thinner outside plate.

129. The loss of strength in compression due to overloading is known as

A) Creep B) Relaxation

C) Resilience D) None of these.

130. The ratio of maximum shear stress to the average shear stress in a rectangular beam subjected to torsion is

A) $\frac{2}{3}$ B) $\frac{3}{2}$

C) $\frac{4}{5}$ D) $\frac{5}{4}$

131. An aquiclude is

A) a non-artesian aquifer

B) a confined bed of impervious material between aquifers

C) an artesian aquifer

D) a large water body underground.

132. Perched aquifers generally occur

A) below water table B) in aquicludes

C) above water table D) in artesian aquifers.

133. Consider the following statements :

Assertion (A) : Groundwater from artesian wells is a good source.

Reason (R) : It contains no suspended matter and no bacteria. It requires lesser treatment.

Now select your answer according to the coding scheme given below :

A) Both *(A)* and *(R)* are correct

B) Both *(A)* and *(R)* are not correct

C) *(A)* is true, but *(R)* is false

D) *(A)* is false, but *(R)* is true.

134. The storage capacity of a reservoir may be divided into three zones. The lowest zone is

A) dead storage B) useful storage

C) surcharge storage D) none of these.

135. Dicken's formula for high flood estimate, is useful for the catchments in

A) Southern India B) Northern India

C) Eastern India D) Western India.

136. In India rainfall is generally recorded at

A) 8 A.M. B) 12 Noon

C) 4 P.M. D) 8 P.M.

137. If S_y = specific yield and S_r = specific retention, then

A) $S_y + S_r$ = Void Ratio B) $S_y + S_r$ = Porosity

C) $S_y + S_r = 1{\cdot}0$ D) $S_y + S_r$ = Permeability.

138. The discharge per unit draw-down at a well is known as

A) specific yield B) safe yield

C) specific storage D) specific capacity.

139. The unit of intrinsic permeability is

A) cm / day B) cm^2

C) darcy / day D) cm.

140. The phenomenon of evaporation from water surfaces, soil and plants is generally known as

A) vaporization B) boiling

C) transpiration D) hydration.

141. Silt carrying capacity of water in a channel depends on

A) discharge B) surface slope

C) grade of silt D) all of these.

142. A high velocity conduit for conveying water to lower level is called

A) hydraulic ramp B) superchannel

C) chute D) aqueduct.

143. A crop which is raised entirely with the help of rainfall, is called

A) Natural crop B) Rainy crop

C) Wet crop D) Dry crop.

144. Which of the following dams needs least maintenance ?

A) Gravity dam B) Timber dam

C) Rock-fill D) Earth dam.

145. Match **List I** with **List II** correctly and select your answer using the codes given below :

	List I		**List II**
a)	A head regulator is constructed	1.	to distribute water to folds
b)	A minor is constructed	2.	at the head of a minor
c)	A diversion head is constructed	3.	near the head regulator
d)	An outlet is constructed	4.	at the head of the canal

Codes :

	a	*b*	*c*	*d*
A)	4	3	2	1
B)	1	2	4	3
C)	4	2	3	1
D)	1	3	2	4.

146. Perennial canals are used for

A) taking off from ice-fed perennial river

B) diversion of flood water of river

C) draining off water from waterlogged area

D) all of these.

147. Drainage water flows freely under gravity in

A) Aqueduct B) Syphon aqueduct

C) Superpassage D) Syphon.

148. The probable maximum flood is

A) an extremely large but physically possible flood in the region

B) a flood considered while designing canals

C) a flood considered while designing spillways

D) none of these.

149. Which of the following geological formations is essentially impermeable for flow of water even though it may contain water in its pores ?

A) Aquifuge B) Aquifer

C) Aquiclude D) all of these.

150. The ability of a driver to stop the vehicle moving with a designed speed, depends upon

A) perception time

B) brake reaction time

C) efficiency of the brakes

D) frictional resistance between road surface & vehicle.

151. Parking lanes are provided on

A) urban roads B) national highways

C) major district roads D) state highways.

152. Weaving is

A) merging B) diverging

C) crossing D) merging, travelling and diverging.

153. An instrument used to study "spot speed" in traffic engineering is

A) speedometer B) enoscope

C) speed recorder D) enometer.

154. The area of most acute vision of a driver is a cone of

A) 15° B) 10°

C) 3° D) 20°.

155. Match **List I** with **List II** correctly and select your answer using the codes given below :

List I		List II
a)	Advantage of "one-way" traffic stream is	1) progressive signals system
b)	Advantage of a rotary is	2) reduce number of points of conflicts
c)	Advantage of closing certain side streets is	3) reduce delay of congestion
d)	Advantage of Traffic Management Measure is	4) no waiting time.

Codes :

	a	*b*	*c*	*d*
A)	2	4	1	3
B)	4	3	1	2
C)	1	2	3	4
D)	3	2	4	1.

156. In water-bond macadam roads,

A) Small booker stones are laid in two layers

B) voids between the stones are filled by stone dust

C) camber for drainage is given at the formation level itself

D) all of these.

157. Match **List I** with **List II** correctly and select your answer using the codes given below :

List I		List II	
a)	stop sign	1.	warning sign
b)	cycle crossing sign	2.	mandatory sign
c)	left hand curve sign	3.	prohibitory sign
d)	speed limit sign	4.	warning sign.

Codes :

	a	*b*	*c*	*d*
A)	3	2	1	4
B)	2	1	4	3
C)	1	3	2	4
D)	4	3	2	1.

158. The raising of outer edge of the road above the inner edge is known as

A) gradient B) superelevation

C) camber D) terrain.

159. The type of transition curve recommended by IRC is

A) cubic parabola B) lemniscate

C) spiral D) none of these.

160. $e = \frac{v^2}{gR}$ is the relationship between superelevation and

A) gradient B) camber

C) cant D) centrifugal ratio.

161. The convexity provided to the cross-section of the surface of carriageway is termed as

A) gradient B) slope

C) curvature D) camber.

162. Which of the following statements is correct ?

A) The angle of superelevation is inversely proportional to the speed limit

B) The angle of superelevation is inversely proportional to the radius of the curve

C) Both (A) and (B)

D) None of these.

163. The slab thickness of the R. C. C. road may be calculated by the formula

A) $t = \sqrt{\frac{3W}{M}}$ B) $t = \sqrt{\frac{2{\cdot}4\ W \times C}{M}}$

C) both (A) and (B) D) $t = \sqrt{\frac{4W}{M}}$.

164. The main object of providing a camber is

A) to make the road surface impervious

B) to make the road surface durable

C) to drain off rain water from road surface, as quickly as possible

D) all of these.

165. The superelevation e to be provided on a circular curve of radius R for a speed V is given by

A) $e = \frac{V}{10R}$ B) $e = \frac{V}{15R}$

C) $e = \frac{V^2}{10R}$ D) $e = \frac{V^2}{15R}$.

166. The amount of superelevation to be given to a curve is given by the formula

A) $\tan\theta = \frac{M^2}{15R}$ B) $\tan\theta = \frac{M^2}{12R}$

C) $\tan\theta = \frac{M}{15R}$ D) $\tan\theta = \frac{M}{12R}$

167. The superelevation is

A) directly proportional to the velocity of vehicles

B) inversely proportional to the velocity of vehicles

C) directly proportional to the width of pavement

D) inversely proportional to the width of pavement.

168. The maximum rate of superelevation e is given by

A) $e = \frac{V^2}{424R}$ B) $e = \frac{V^2}{224R}$

C) $e = \frac{V^2}{540R}$ D) $e = \frac{V^2}{1000R}$

169. The gradient of a road depends upon the

A) nature of the traffic B) nature of the ground

C) rainfall of the locality D) all of these.

170. Between two rails, a gap of ..... is provided for free expansion of the rails due to rise in temperature.

A) 1·5 mm to 3 mm B) 3 mm to 6 mm

C) 6 mm to 9 mm D) 9 mm to 12 mm.

171. The standard width of ballast for broad gauge track on Indian Railway is

A) 2·3 m B) 2·9 m

C) 3·35 m D) 5·53 m.

172. Superelevation on curves is provided by means of

A) cant board B) straight edge

C) spirit level D) all of these.

173. The portion of a road surface, which is used by vehicular traffic is known as

A) carriageway B) shoulder

C) expressway D) all of these.

174. The station having two lines is called a

A) crossing station B) flag station

C) junction station D) terminal station.

175. A track assembly used for diverting train from one track to another track is known is

A) turn–out B) crossing

C) junction D) none of these.

176. A cross–over requires

A) two sets of switches and two crossings

B) two sets of switches and four crossings

C) four sets of switches and four crossings

D) none of these.

185. The three time estimates for the activites of the network shown in figure are given. The earliest expected time for the

is

A) 14 B) 12

C) 36 D) none of these.

186. Construction team means

A) an engineer B) an owner

C) a contractor D) all of them.

187. Time and progress chart of a construction is also known as

A) bar chart B) modified milestone chart

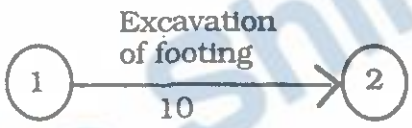
C) critical path method D) all of these.

188. PERT analysis is based on

A) optimistic time B) pessimistic time

C) most likely time D) all of these.

189. In the given figure, the method of a project represents



A) activity of an excavation of a footing

B) activity of an excavation which starts at event No. 1 and ends at event No.2

C) activity of excavation which takes 10 units of time

D) none of these.

190. The heart of microcomputers is

A) Microprocessor B) RAM

C) ROM D) UPS.

191. A. L. U. means

A) Arithmetic Logarithmic Unit B) Arithmetic Logic Unit

C) Automatic Logic Unit D) None of these.

192. Memory size of 'A' drive floppy is

A) 1·54 MB B) 1·42 MB

C) 1·44 MB D) 1·34 MB.

193. LAN refers to

A) Local Area Network B) Large Area Network

C) Logical Area Network D) All of these.

194. Which of the following is not a system resource ?

A) CPU, ALU, Control unit B) Operating system

C) Memory D) Data.

195. To create separator lines, which label is used ?

A) – – B) →

C) ← D) ~.

196. Match **List I** with **List II** correctly and select your answer using the codes given below :

List I	**File**	**List II**	**Description**
a)	*.lsp	1)	Auto CAD line type definition files
b)	*.lin	2)	Auto CAD Dialog Control Language
c)	*.dcl	3)	Auto LISP Program files
d)	acad.lin	4)	A user-defined Auto LISP routine that loads each time you start Auto CAD.

Codes :

	a	*b*	*c*	*d*
A)	3	1	2	4
B)	3	2	4	1
C)	2	3	1	4
D)	1	3	4	2.

197. Pick the odd one out :

A) Keyboard B) Graphics Tablet

C) Monitors D) Mouse.

198. Pick the odd one out :

A) MS Access B) Oracle

C) Base D) Excel.

199. Match **List I** with **List II** correctly and select your answer using the codes given below :

	List I		**List II**
a)	First Generation	1)	Transistors
b)	Second Generation	2)	Vacuum tube
c)	Third Generation	3)	Large scale integrated circuits
d)	Fourth Generation	4)	Integrated circuits.

Codes :

	a	***b***	***c***	***d***
A)	2	1	4	3
B)	1	2	3	4
C)	2	4	1	3
D)	3	4	1	2.

200. A flow-chart is ..... of the sequence of the steps to be followed in a solution of a problem.

A) Pictorial depiction B) Problem formulation

C) Testing the program D) Documentation.

(SPACE FOR ROUGH WORK)

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