01 C

01	**QUESTION BOOKLET** **Post:** Jr. Engineer (Civil) INSTRUCTIONS	Q.B. Number: 130676

Roll Number: | 1 | 0 | 2 | 0 | | 0 | 0 | | | | |

Q.B. Series: **C**

Please read the following instructions carefully.

1) Mark carefully your Roll Number, Question Booklet Number and series of the paper on the OMR Answer Sheet and sign at the appropriate place. Write your Roll number on the question booklet.

YOUTUBE CHANNEL

2) Strictly follow the instructions given by the Centre Supervisor / Room invigilator and those given on the Question Booklet. Please ensure you fill all the required details and shade the bubbles correctly on the OMR Answer Sheet.

3) Please mark the right responses ONLY with Blue/Black ball point pen. USE OF PENCIL AND GEL-PEN IS NOT ALLOWED.

4) Candidates are not allowed to carry any papers, notes, books, calculators, cellular phones, scanning devices, pagers etc. to the Examination Hall. Any candidate found using, or in possession of such unauthorized material, indulging in copying or impersonation or adopting unfair means, is liable to be summarily disqualified and may be subjected to penal action.

5) After finishing the examination, hand over the complete question booklet and the OMR Answer Sheet. DO NOT carry the question booklet or any part of it, outside the examination room. Doing so, is a punishable offence.

6) The test is of objective type. This Question Booklet contains a total of 150 questions and the total time allotted is 2 hours 30 minutes.

7) Each objective question is followed by four responses. Your task is to choose the correct response and mark your response on the OMR Answer Sheet and NOT on the Question Booklet.

8) All questions are compulsory. There will be no NEGATIVE MARKING.

9) For each answer as shown in the example below. The CORRECT and the WRONG method of darkening the CIRCLE on the OMR sheet are given below.

Correct Method   Wrong Method

10) In view of the tight time span, do not waste your time on a question which you find to be difficult. Go on solving questions one by one and come back to the difficult questions at the end.

11) DO NOT make any stray marks anywhere on the OMR Answer Sheet. DO NOT fold or wrinkle the OMR Answer Sheet. Rough work MUST NOT be done on the answer sheet. Use your question booklet for this purpose.

1. The weight of a concrete sleeper is about
   (A) 50 kg
   (B) 100 kg
   (C) 150 kg
   (D) 300 kg

2. Range of camber in areas of heavy rainfall for earth road is
   (A) 2%
   (B) 2.5%
   (C) 6%
   (D) 4%

3. The versine of a chord of length C and radius of curve as R is
   (A) $C^2/8R$
   (B) $8R^2/C$
   (C) $8C^2/R$
   (D) $C/8R^2$

4. Water hammer is caused due to
   (A) elastic material of the pipe.
   (B) sudden closure of a valve in a pipe flow.
   (C) incompressibility of the fluid.
   (D) sudden opening of a valve in a pipe flow.

5. The chloride and sulphate contents of treated water for public supplies should be less than
   (A) 400 ppm
   (B) 200 ppm
   (C) 250 ppm
   (D) 300 ppm

6. If the intensity of load varies linearly, the bending moment will vary
   (A) linearly.
   (B) parabolically.
   (C) hyperbolically.
   (D) cubically.

7. If EI is the flexural rigidity of the column then, the width of analogous column in the method of column analogy is (symbols/notations carry their usual meaning)
   (A) 1/EI
   (B) 2/EI
   (C) 3/EI
   (D) 4/EI

8. An old type of survey chain having a total length of 66 ft. and composed of 100 links, is known as
   (A) Gunter's chain
   (B) Revenue chain
   (C) Engineer's chain
   (D) Band chain

9. If m = number of micrometres, and n = number of sets then to eliminate errors of graduation, the limb is shifted through a number of degrees equal to (symbols/notations carry their usual meaning)
   (A) $90°/mn$
   (B) $180°/mn$
   (C) $mn/120°$
   (D) $360°/mn$

10. Depending on the size, shape and the head of the liquid of an orifice-meter under which the flow takes place, the value of co-efficient of discharge varies in the range of
    (A) 0.32 to 0.35
    (B) 0.75 to 1.00
    (C) 0.40 to 0.45
    (D) 0.62 to 0.65

11. EMD(Earnest Money Deposit) is
    (A) the same as security deposit.
    (B) depositing 2% of the contract value.
    (C) depositing 10% of the contract value.
    (D) depositing 5% of the contract value.

12. Moment due to a force in statics is found using,

(A) vector cross product.

(B) vector subtraction.

(C) vector addition.

(D) vector dot product.

13. Altimeters are generally calibrated at a temperature of

(A) 5°F

(B) 100°F

(C) 50°F

(D) 180°F

14. Silt ejector is provided on

(A) the river just upstream of the under-sluices.

(B) the canal, just downstream of the canal head regulator.

(C) the river some distance downstream of the under-sluices.

(D) the canal, at some distance downstream of the canal head regulator.

15. The creep in concrete is NOT affected by which of the following?

(A) Magnitude of the stress

(B) Age at the commencement of loading

(C) Duration of loading

(D) Only the stress due to wind load

16. Spherical excess depends upon the area of geodetic triangle and may be ignored if the length of the sides is less than

(A) 5 Km

(B) 3.5 Km

(C) 7.5 Km

(D) 10 Km

17. A person having overall responsibility for co-ordinating in a massive construction project is

(A) the Owner.

(B) the Architect.

(C) the Project Manager.

(D) the Contractor.

18. The discharge carried by a minor distributary system is usually less than

(A) 0.5 cumecs

(B) 1.0 cumecs

(C) 2.5 cumecs

(D) 0.25 cumecs

19. The pedestrian green time, required for the major and minor roads are calculated based on walking speed of

(A) 3.6 m/s

(B) 4.8 m/s

(C) 1.2 m/s

(D) 2 m/s

20. Magnetic meridian swings like a pendulum swinging in the reverse direction for a given place. This is known as

(A) diurnal variation

(B) annual variation

(C) irregular variation

(D) secular variation

21. When the tape of length 'L' is supported between two points, W is the total weight of the tape and P is the pull applied, then the correction for sag is (symbols/notations carry their usual meaning)

(A) $L^2W/24\,P$

(B) $LW^2/24.\,P$

(C) $LW^2/24\,P^2$

(D) $W^2/24\,P$

22. What is the usage of Muller-Breslau's principle?

(A) For drawing influence lines of statically determinate and indeterminate structures.

(B) For drawing influence lines of statically determinate structures only.

(C) For finding the slope and deflection of a beam.

(D) For drawing influence lines of statically indeterminate structures only.

23. The underground map is drawn to a scale of

(A) 1 in 100

(B) 1 in 500

(C) 1 in 1000

(D) 1 in 50

24. The length Ls of an ideal transition curve is

(A) directly proportional to the radius

(B) inversely proportional to the radius

(C) equal to the radius

(D) equal to infinity

25. In an under reinforced section,

(A) concrete is fully stressed to its permissible value.

(B) steel is fully stressed to its permissible value.

(C) concrete and steel both are partially stressed to their permissible value.

(D) steel is partially stressed to its permissible value.

26. While conducting final location survey, the centre line is fully marked with pegs at a distance of

(A) 20 m   + at every 1cm large pegs are used

(B) 10 m

(C) 30 m

(D) 50 m

27. Alkaline soils are best reclaimed by

(A) leaching only.

(B) addition of chlorine to the soil.

(C) providing good drainage.

(D) addition of gypsum and leaching.

28. The main objective of planning is to execute the project

(A) only in time.

(B) only for most economical purposes.

(C) safely.

(D) most economically and in time.

29. An irrigation outlet is said to be proportional when its

(A) Setting = outlet index/channel index

(B) Setting = channel index/outlet index

(C) Setting = channel index x outlet index

(D) Setting = channel index + outlet index

30. In India, a curve is designated by the angle in degrees subtended at the centre by a chord of length

(A) 15 m

(B) 30 m

(C) 60 m

(D) 75 m

31. Normally on a curved track, the number of dog spikes per rail seat is

(A) one on either side

(B) one on outside and two inside

(C) two outside and two inside

(D) two outside and one inside

32. Consolidation in soils

(A) is a function of strain.

(B) does not depend on the present stress.

(C) is a function of pore water pressure.

(D) is a function of total stress.

33. Feasibility report is prepared during which of the following phases of the project?

(A) Intermediate phase

(B) Initial phase

(C) Final phase

(D) After completion of the project

34. The members of a pin-jointed truss are subjected to bending when,

(A) the material of the truss is brittle.

(B) the truss is of span less than 3m.

(C) the loads are not applied at the joints.

(D) the supports of the truss are hinged.

35. The Indian standard code for the design of concrete mix is

(A) IS 456-2000

(B) IS 800-2007

(C) IS 875-1987

(D) IS 10262-2009

36) When HYSD bars are used, the reinforcement in either direction of RCC slabs shall not be less than

(A) 0.12% of the total cross-sectional area.

(B) 0.20% of the total cross-sectional area.

(C) 0.15% of the total cross-sectional area.

(D) 0.80% of the total cross-sectional area.

37. Which of the following grades of concrete is used as a minimum grade for R.C.C design near the sea cost?

(A) M 25

(B) M 20

(C) M 30

(D) M 40

38. Sleeper density in terms of number of sleepers per km for traffic density of 10 to 20 GMT is

(A) 1540

(B) 1310

(C) 1490

(D) 1660

39) A PERT network used for project management is

(A) event oriented.

(B) neither activity nor event oriented.

(C) both activity as well as event oriented.

(D) activity oriented only.

40. A soil is said to be active clay if the activity value is

(A) greater than 1.25

(B) between 0.75 and 1.2

(C) less than 0.75

(D) zero

41. The most economical central angle of an arch ring in an arch dam, is

(A) 123 degrees 34 minutes

(B) 143 degrees 34 minutes

(C) 133 degrees 34 minutes

(D) 153 degrees 34 minutes

42) Design period of sewage treatment plant is recommended as

(A) 5 years

(B) 15 years

(C) 25 years

(D) 50 years

43. For broad gauge (BG), Indian Railways has standardized a rail length of

(A) 13 m

(B) 10 m

(C) 9 m

(D) 20 m

44. The maximum quantity of water that can be supplied from a reservoir with guaranteed yield during critical periods, is called

(A) Reservoir yield

(B) Design yield

(C) Secondary yield

(D) Firm yield

45. Which of the following represents the area under stress-strain diagram?

(A) The ability of the material to resist against deformation

(B) Hardness of the material

(C) Elongation property

(D) Energy absorbed before failure

46. Blue-baby disease is caused due to the presence of

(A) chlorides.

(B) nitrites.

(C) nitrates.

(D) sulphides.

47) Line-of-Balance(LOB) is a

(A) modified bar chart.

(B) modified mile stone chart.

(C) planning technique for repetitive work projects.

(D) report of estimation.

48. If fy is the yield stress and Es is the modulus of elasticity of reinforcing steel bars, then the maximum strain in this steel at failure is given by (symbols/notations carry their usual meaning)

(A) (fy/1.15Es)+0.002

(B) (fy/1.15Es)+0.0035

(C) 0.0035Es

(D) 0.002Es+fy

49. In the scheduling stage of a project the difference between the latest allowable date and the earliest expected date is known as

(A) Event time

(B) Start time

(C) Slack time

(D) End time

50. Which of the following is the actual cause of failure for ductile materials during tensile test?

(A) Compression

(B) Fatigue

(C) Strain·

(D) Shear

51. Vane test is normally used for determination of in-situ shear strength of

(A) soft clays.

(B) sand.

(C) stiff clays.

(D) loamy soil.

52. For testing a 30m chain, the overall length of the chain should be within which of the following permissible limits?

(A) 30m chain ± 12mm

(B) 30m chain ± 16mm

(C) 30m chain ± 3mm

(D) 30m chain ± 8mm·

53. Which of the following is responsible for the formation of cohesionless soils?

(A) Chemical decomposition·

(B) Hydration

(C) Physical disintegration

(D) Oxidation

54. Mach's Number is defined as the square root of the ratio of the

(A) inertia force to the surface tension force.

(B) inertia force to the pressure force.

(C) inertia force to the elastic force.

(D) inertia force to the viscous force.

55. The relationship between the radius and the degree of a circular curve for a 30m arc is given by

(A) R=1719/D

(B) D=1719/√R

(C) D=1719/R²

(D) R=1719/D²

56. The softening of soil due to liberation of water during thawing is known as

(A) bulking of sand.

(B) slanking of clay.·

(C) soil suction.

(D) frost boil.

57. For a circular area of diameter 'd', the radius of gyration about an axis passing through the whole length of the diameter is

(A) d/2

(B) d/8

(C) d/4·

(D) d/3

58. A life cycle curve is useful for

(A) progress review and control.·

(B) financial control.

(C) showing interdependencies of activities.

(D) showing the milestones clearly

59. The maximum angle of inclination at which a body at rest just begins to slide down the plane is called

(A) angle of inclination.

(B) angle of repose.

(C) angle of response.

(D) angle of sliding.

60. Any regulation having obstruction in an open stream over which the flow takes place is known as

(A) Streamline

(B) Orifice

(C) Weir.

(D) Venturi

61. For weirs and barrages, the approaching Froude number usually lies in the range of

(A) 1 to 2.4.

(B) 2.5 to 4.5.

(C) 4.6 to 9.0.

(D) 10 to 11

62. Which of the following is not a cash-crop?

(A) Jute

(B) Tea

(C) Rice

(D) Sugarcane

63. Duty on capacity is also called

(A) capacity factor.

(B) quality duty.

(C) outlet duty.

(D) full supply coefficient.

64. The geological formation of stratum of impervious material which may contain water but does not transmit any significant quantities is called

(A) aquifer

(B) aquiclude

(C) aquifuge well

(D) aquitard

65. In a certain flow the velocity and pressure at a point exhibit irregular fluctuations of high frequency. This is the most essential feature of which of the following flows?

(A) Compressible flow

(B) Laminar flow

(C) Turbulent flow

(D) Incompressible flow

66. Water losses in water supply system, are assumed as

(A) 0.05

(B) 0.075

(C) 0.15

(D) 0.25

67. The ratio between the centrifugal force and the weight of the vehicle is known as centrifugal ratio (CR). For railways this ratio is

(A) 1/8

(B) 1/4

(C) 1/6

(D) 1/12

68. Width of the carriage way for two lanes with raised kerbs as recommended by IRC is

(A) 3.75m

(B) 7.0m

(C) 7.5m

(D) 5.5m

69. Precedence network, a method of graphical representation of project management is also known as

(A) A-O-C network

(B) A-N-O network

(C) A-A-O network

(D) A-O-N network

70. To have good drainage of the ballast section, cross-slope of the formation should be

(A) 1 in 20·

(B) 1 in 40

(C) 1 in 50

(D) 1 in 100

71. In triaxial shear test the stress is uniformly distributed on the

(A) failure plane.

(B) normal plane.

(C) vertical plane.

(D) shear plane.·

72. In a plane truss, M is the number of members, R is the number of reactions and J is the number of joints. Then this truss is said to be statically determinate if, (symbols/notations carry their usual meaning)

(A) J = M+R

(B) J = 2M+R

(C) 3J = M+2R

(D) 2J = M+R

73. The maximum limit of super elevation in plain and rolling terrains as per IRC recommendations is

(A) 0.05 ·

(B) 0.07

(C) 0.1

(D) 0.12

74. In Kennedy's theory the critical velocity ratio, under no silting condition is

(A) less than one.

(B) equal to zero. ·

(C) greater than one.

(D) equal to one.

75. The laminar flow is possible when,

(A) the fluid particles moves in a zig-zag way.

(B) the Reynold's number is 3000.

(C) the fluid is highly viscous. ·

(D) the velocities are very high.

76. The compass which measures the quadrantal bearings, is the

(A) Prismatic compass

(B) Plane compass

(C) Surveyor's compass ·

(D) Bearing compass

77. Irrotational flow means

(A) the fluid does not rotate while moving.

(B) the fluid moves in straight lines. ·

(C) the net rotation of fluid particles about their mass centre is zero.

(D) the fluid moves in parabolic lines.

78. In a circular pipe for a laminar flow,

(A) maximum velocity=1.5 times the average velocity.

(B) maximum velocity=2.0 times the average velocity.

(C) maximum velocity=2.5 times the average velocity.

(D) maximum velocity=4.5 times the average velocity.

79. If the design speed of a vehicle is 100 km/hr, then the safe stopping sight distance for design is around

(A) 100m ·

(B) 150m

(C) 180m

(D) 280m

80. If L -length of pipe, C - velocity of pressure produced due to water hammer, then which of the following is true for the rapid closure condition of the valve?

(A) The time taken for valve closure is greater than $2L/C$.

(B) The time taken for valve closure is less than L/C.

(C) The time taken for valve closure is less than $2L/C$. ·

(D) The time taken for valve closure is greater than $2L/C^2$.

81. The moisture content for a crop at permanent wilting point is the

(A) capillary water.

(B) hygroscopic water.

(C) field capacity.

(D) hydrated water.

82. Planning is important in a construction project, as it is advantageous to the

(A) Contractor alone

(B) Architect alone

(C) Client alone

(D) Contractor, Architect, Engineer as well as the client.

83. The class limit of the slope of a country, for plain terrains is

(A) 0-10%

(B) 10-20%

(C) 25-60%

(D) greater than 60%

84. The permissible tensile stress for HYSD bars of grade Fe500 is

(A) 275 N/m²

(B) 230 N/m²

(C) 140 N/m²

(D) 415 N/m²

85. The process in which the original hard state of the clays is regained in the course of time, that was softened by remoulding is termed as

(A) isotropy

(B) anisotropy

(C) thixotrophy

(D) allotropy

86. The staff is held in which of the following positions in tangential tacheometry?

(A) Inclined at any angle

(B) Normal to the line of sight at any angle

(C) Inclined at 45° only

(D) Vertical

87. A mono block sleeper has

(A) square section.

(B) rectangular section.

(C) semi-circular section.

(D) trapezoidal section.

88. The most efficient cross section of sewer to carry combined flow, is

(A) circular shaped.

(B) rectangular shaped.

(C) horse-shoe shaped.

(D) egg-shaped.

89. The unconfined compression test is generally applicable to saturated clays for which the apparent angle of shearing resistance is

(A) 45°

(B) 60°

(C) 0°

(D) 90°

90. If x_u is the depth of neutral axis in the limit state of collapse for flexure, the depth of centre of compressive force from the extreme fibre in compression is

(A) $0.53x_u$

(B) $0.42x_u$

(C) $0.12x_u$

(D) $0.23x_u$

91. The Mota Singh liner is an effective liner used with loose jaws steel trough sleeper for overcoming the problems of

(A) circular holes.

(B) hexagonal holes.

(C) elongated holes.

(D) elliptical holes.

92. The unsupported length of a RCC column between end restraints shall not exceed
    (A) 60 times its least lateral dimension.
    (B) 40 times its least lateral dimension.
    (C) 30 times its least lateral dimension.
    (D) 35 times its least lateral dimension.

93. The most widely used coagulant for water treatment is
    (A) lime and soda.
    (B) ferrous sulphate.
    (C) alum.
    (D) chlorinated copper.

94. The path taken by smoke coming out of chimney is a
    (A) stream-line.
    (B) path-line.
    (C) streak-line.
    (D) break-line.

95. Intergranular pressure can also be called as
    (A) neutral pressure.
    (B) effective pressure.
    (C) pore pressure.
    (D) passive pressure.

96. The width of speed breakers is greater than the wheel base of common vehicles but the height is
    (A) 150 mm
    (B) 200 mm
    (C) 100 mm
    (D) 30 mm

97. The rate of flow of sewage is generally assumed to be
    (A) more than the rate of water supply.
    (B) equal to the rate of water supply.
    (C) less than the rate of water supply.
    (D) 150 litres per capita.

98. For limit state method of design the permissible bearing stress on full area of concrete shall be
    (A) 0.25 fck
    (B) 0.15 fck
    (C) 0.65 fck
    (D) 0.45 fck

99. Bhakra Dam is an example of
    (A) Roosevelt dam
    (B) Gravity dam
    (C) Aswan dam
    (D) Arch dam

100. The evaporation losses from the surface of the reservoir can be reduced by sprinkling
    (A) DDT.
    (B) potassium permanganate.
    (C) cetyl alcohol.
    (D) pesticides.

101. In metric units the rail is designated in terms of
    (A) Pounds per yard
    (B) Kg/m
    (C) Newtons per yard
    (D) N/cm

102. Which of the following is a form of water transported soil?
    (A) alluvial soil
    (B) coarse grained soil
    (C) fine grained soil
    (D) loamy soil

103. A geological formation which not only stores water, but can yield it in sufficient quantity, is known as an
    (A) aquiclude.
    (B) aquitard.
    (C) aquifer.
    (D) aqifuge.

104. The ultimate shrinkage strain for RCC design as per IS-456 can be taken as
(A) 0.005 mm/m
(B) 0.0004 mm/m
(C) 0.002 mm/m
(D) 0.0003 mm/m

105. The major quality control methods of construction management are
(A) Curing, Sampling and Testing
(B) Mixing , Testing and Curing
(C) Checking, Sampling and Mixing
(D) Inspection, Testing and Sampling

106. The dead storage zone in a reservoir is provided for the storage of
(A) water for the firm power.
(B) water for water supplies.
(C) sand and silt .
(D) distilled water.

107. If T is tractive force and α is the turning angle then the curve resistance is given by
(A) T Cosα
(B) T Sinα
(C) T (1-Cosα)
(D) T (1-Sinα)

108. A cantilever of span 'L' has a moment M acting at the free end. The shear force at the free end will be (symbols/notations carry their usual meaning)
(A) M/L
(B) ML
(C) M/2L
(D) zero

109. The height of the eye level of the driver from the road surface as per IRC recommendations is taken as
(A) 2.2m
(B) 1.4m
(C) 1.11m
(D) 1.2m

110. The minimum depth of ballast below the sleeper on any gauge adopted by Indian Railways is
(A) 150 mm
(B) 250 mm
(C) 300 mm
(D) 325 mm

111. Usually adjustment of rails is needed whenever the creep exceeds
(A) 100 mm
(B) 75 mm
(C) 200 mm
(D) 150 mm

112. A simply supported beam AB of span L carries a uniformly distributed load of w/unit length, with constant flexural rigidity EI. Find the slope at the support A. (symbols/notations carry their usual meaning)
(A) $wL^3/48EI$
(B) $wL^3/24EI$
(C) $wL^2/48EI$
(D) $wL^2/24EI$

113. Which of the following represents the correct relationship between the porosity (N), specific yield (Y), and specific retention(P)? (symbols/notations carry their usual meaning)
(A) R = N+Y
(B) Y = N+R
(C) R > N+Y
(D) N = Y+R

114. The canal fall, involving parabolic glacis is called as
(A) Straight glacis.
(B) Notch type fall.
(C) Inglis fall.
(D) Montague type fall.

115. Which of the following will reduce the creep of rails in a railway track?

(A) Spikes

(B) Bearing plates

(C) Chairs

(D) Anchors

116. Man power planning for any project is necessary for

(A) ensuring the efficient execution of projects undertaken.

(B) the proper planning of the design.

(C) ensuring cost reduction of materials.

(D) ensuring only for the proper safety in construction.

117. An instrument used for measuring the slope of the ground is

(A) Speedometer

(B) Clinometer

(C) Pedometer

(D) Passometer

118. The anchorage value of a standard U-type hook shall be equal to

(A) 25 times of the diameter of the bar.

(B) 10 times of the diameter of the bar.

(C) 12 times of the diameter of the bar.

(D) 16 times of the diameter of the bar.

119. The value of Khosla's safe exit gradient for usual alluvial river soils of our country is

(A) 0

(B) 1

(C) infinity

(D) 1/4 to 1/6

120. Side face reinforcement shall be provided along the two faces of a reinforced concrete beam, when the depth of the web exceeds

(A) 550 mm

(B) 250 mm

(C) 900 mm

(D) 750 mm

121. The ratio of the volume of voids to the total volume of soil is termed as

(A) void.

(B) air content.

(C) porosity.

(D) degree of saturation.

122. For two way continuous slabs of shorter spans upto 3.5m with steel grade Fe415, the span to overall depth ratio which satisfies the vertical deflection limits is

(A) 35

(B) 32

(C) 40

(D) 25

123. Hydraulic gradient line (H.G.L) represents

(A) Pressure head + Kinetic head

(B) Kinetic head + Datum head

(C) Pressure head + Kinetic head + Datum head

(D) Pressure head + Datum head

124. For a rectangular grit chamber, if the horizontal velocity of flow is 0.25 m/sec and the detention period is 1 minute, then the length of the tank is

(A) 15m

(B) 25m

(C) 240m

(D) 60m

125. The geological formation, which does not contain any amount of ground water is an

(A) aquitard

(B) aquifer

(C) aquiclude

(D) aquifuge

126. Scheduling is aimed at

(A) planning for only the human resources required.

(B) only the financial control of the project.

(C) preparing the estimate of the materials only.

(D) carrying out the project effectively.

127. Which of the following materials is the most malleable?

(A) Tin

(B) Indium

(C) Lithium

(D) Aluminium

128. The population growth curve is

(A) S-shaped.

(B) parabolic.

(C) circular.

(D) straight line.

129. The length of transition curve may be such that the rate of change of radial acceleration generally does not exceed a certain value which is

(A) 30 cm/sec².

(B) 45 cm/sec².

(C) 60 cm/sec².

(D) 25 cm/sec².

130. In case of forced vortex, the rise of liquid level at the ends is

(A) less than the fall of liquid level at the axis of rotation.

(B) more than the fall of liquid level at the axis of rotation.

(C) equal to the fall of liquid level at the axis of rotation.

(D) zero.

131. As per IRC, if V is the speed of the vehicle in Km/hr and R is the radius of the curve in meters, then the length of the transition curve for mountainous and steep terrains should not be less than

(A) $2.7V^2/R$

(B) $9.81V^2/R$

(C) $3.6V^2/R$

(D) V/R^2

132. For a simply supported girder, the maximum bending moment due to the train of wheel loads,

(A) always occurs at the centre of the span.

(B) always occurs under a wheel load.

(C) always occurs in between centre and a wheel load.

(D) always occurs in between two wheel loads.

133. Hydraulic Jump occurs when the flow changes from

(A) super-critical to sub-critical

(B) sub-critical to super-critical

(C) critical to turbulent

(D) laminar to turbulent

134. Coulomb's theory of earth pressure is based on

(A) the theory of elasticity.

(B) the theory of plasticity.

(C) Empirical rules of soil.

(D) Wedge theory.

135. The valley curve is made transitional to design its length and is set out to be of cubic parabola shape with equation $y=ax^3$. What is the value of the constant 'a' if N=deviation angle and L is the length of the valley curve?

(A) $2N/3L^2$

(B) N/L

(C) $N/4L$

(D) $N/1.5L$

136. The centre of gravity for a hemisphere of radius 'r' from its base is (symbols/notations carry their usual meaning)

(A) 2r/4

(B) 7r/4

(C) 3r/8

(D) r/2

137. The gas formed by the reaction of calcium carbide with water is

(A) carbon dioxide.

(B) acetylene.

(C) ethane.

(D) sulphur-dioxide.

138. The following perpendicular offsets were taken at 20 m intervals from a base-line to an irregular boundary line: - 5.9, 12.4, 16.5, 15.3, 18.3, 20.9, 24.2, 21.8 and 19.2m. Find the area enclosed between the base-line, the irregular boundary line and the first and the last offsets by Simpson's rule.
   (A) 2840.328 m²
   (B) 2832.667 m²
   (C) 2765.835 m²
   (D) 2935.785 m²

139. Darcy-Weisbach equation is used to find the loss of head due to
   (A) sudden enlargement.
   (B) sudden contraction.
   (C) friction.
   (D) viscosity.

140. The grade of steel which is designated as 'Tor 40' in cold twisted deformed bars is
   (A) Fe250
   (B) Fe415
   (C) Fe500
   (D) Fe550

141. For a spherical particle of diameter D, the specific surface S is given by (symbols/notations carry their usual meaning)
   (A) S=6/D
   (B) S=D/6
   (C) S=2D/36
   (D) S=D/9

142. The cost control is not affected in which of the following stages of construction management?
   (A) Planning stage
   (B) Designing stage
   (C) Construction stage
   (D) Testing stage

143. The basic elements of quality in construction management are
   (A) Structural quality, quality of design and quality of conformance
   (B) Structural quality and quality of scaffolding
   (C) Quality of design and quality of materials
   (D) Only structural quality and quality of design

144. The recommended land width for arterial roads as per IRC is
   (A) 50-60 m
   (B) 20-30 m
   (C) 30-40 m
   (D) 10-20 m

145. Continuity equation deals with the law of conservation of
   (A) mass.
   (B) momentum.
   (C) energy.
   (D) velocity.

146. The ruling gradient value on plain and rolling terrain as per the recommendations of IRC is
   (A) 1 in 20
   (B) 1 in 16.7
   (C) 1 in 35
   (D) 1 in 30

147. The Broad gauge has a width of
   (A) 1365 mm
   (B) 1525 mm
   (C) 1676 mm
   (D) 1435 mm

148. In which of the following areas drop manholes are generally required?
   (A) Commercial areas
   (B) Small townships
   (C) Plain areas
   (D) Hilly townships

$= \frac{2\not\!0}{3}\left[(5.9 + 19.2\text{n}) + 4(12.4 + 15.3 + 20.9) + 2(16.5 + 18.3 + 24.2)\right]$
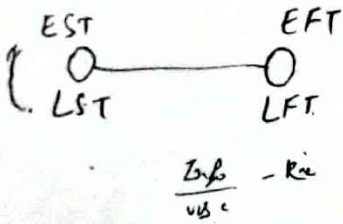
24.8 $118 + 281.6 + 251$

149. The rate of change of discharge through irrigation outlet is equal to the rate of change of water depth in the channel, when its

(A) sensitivity is 1.

(B) setting is 1.

(C) sensitivity is 0.

(D) flexibility is 1.

150. The number of bolts in fish plate at a particular joint is generally

(A) 2

(B) 3

(C) 4

(D) 8

Space for Rough work: