पुस्तिका में पृष्ठों की संख्या–16
No. of pages in Booklet -16
पुस्तिका में प्रश्नों की संख्या–100
No. of Questions in Booklet -100
Subject Code – 02
विषय / SUBJECT : **Civil Engineering**

NEAP-81

PAPER-II

Question Paper Booklet No. प्रश्न–पत्र पुस्तिका संख्या
2018283

समय : **2.00** घण्टे
Time: **2.00** Hours

अधिकतम अंक : **200**
Maximum Marks: **200**

प्रश्न–पत्र पुस्तिका एवं उत्तर पत्रक के पेपर सील / पॉलिथीन बैग को खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न–पत्र पुस्तिका पर वही प्रश्न–पत्र पुस्तिका संख्या अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से दूसरा प्रश्न–पत्र प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।

The candidate should ensure that Question Paper Booklet No. of the Question Paper Booklet and Answer Sheet must be same after opening the Paper Seal/ polythene bag. In case they are different, a candidate must obtain another Question Paper from the Invigilator. Candidate himself shall be responsible for ensuring this.

परीक्षार्थियों के लिए निर्देश

1. **सभी** प्रश्नों के उत्तर दीजिए।
2. **सभी** प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का केवल **एक** ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर पत्रक पर **नीले बॉल प्वॉइंट पेन** से गहरा करना है।
6. OMR उत्तर पत्रक इस परीक्षा पुस्तिका के साथ रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर पत्रक निकाल कर ध्यान से केवल नीले बॉल प्वॉइंट पेन से विवरण भरें। **OMR उत्तर पत्रक पर प्रश्न–पत्र पुस्तिका संख्या ध्यानपूर्वक भरें।**
7. **प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा।** (गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है। किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।)
8. मोबाइल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है, तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानीपूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर **5 अंक** कुल प्राप्तांकों में से काटे जा सकते हैं।
10. यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा।

चेतावनी: *अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए विविध नियमों–प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही विभाग ऐसे अभ्यर्थी को भविष्य में होने वाली विभाग की समस्त परीक्षाओं से विवर्जित कर सकता है।*

INSTRUCTIONS FOR CANDIDATES

1. Answer **all** questions.
2. **All** questions carry equal marks.
3. Only **one** answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as **1, 2, 3, 4**. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN.**
6. The OMR Answer Sheet is kept with this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with **blue** ball point pen only. **Please fill the Question Paper Booklet no. on the OMR Answer Sheet carefully.**
7. **1/3 part of the mark(s) of each question will be deducted for each wrong answer.** (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable materials with him/her will be strictly dealt as per rules.
9. Please correctly fill your Roll Number in O.M.R. Sheet. **5 Marks** can be deducted for filling wrong or incomplete Roll Number.
10. If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English Version of the question, the English Version will be treated as standard.

Warning : *If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted. Department may also debar him/her permanently from all future examinations. s.*

इस परीक्षा पुस्तिका को तब तक न खोलें जब तक कहा न जाए।
Do not open this Test Booklet until you are asked to do so.

1. The drain which is provided parallel to roadway to intercept and divert the water from hill slopes is -

(1) Sloping drain
(2) Catch water drain
(3) Side drain
(4) Cross drain

2. Intermediate vertical stiffeners in plate girders are used to-

(1) Prevent local buckling of the web
(2) Prevent local buckling of the flange
(3) Prevent excessive deflection
(4) Increase the bearing strength of the web

3. Contour lines can unite only in one condition, that is-

(1) Cave
(2) Valley
(3) Vertical cliff
(4) River bed

4. The load carrying capacity of a helically reinforced column as compared to that of a tied column is about-

(1) 5% less
(2) 10% less
(3) 5% more
(4) 10% more

5. Consider the following statements :
The coefficient of permeability 'K' depends upon-
(i) Void ratio of the soil
(ii) Duration of flow
(iii) Diameter of the soil grain
(iv) Shape of the particle
Which of the above statement is correct?

(1) i, ii, iii, iv
(2) ii & iii only
(3) i, iii & iv only
(4) iii & iv only

6. The window provided on the sloping roof of a building is called-

(1) Dormer window
(2) Bay window
(3) Sky light window
(4) Glazed window

7. A survey done to understand the heavenly bodies is known as-

(1) Celestial survey
(2) Astronomical survey
(3) Photographic survey
(4) Aerial survey

8. A prismatic bar when subjected to pure bending assumes the shape of-

(1) Catenary
(2) Cubic parabola
(3) Quadratic parabola
(4) Arc of circle

9. A symmetrical channel section is made of a material which is equally strong in tension and compression. It is used as a simply supported beam with its web horizontal to carry vertical loads. It will be-

(1) Strongest if the web is used as a top face
(2) Strongest if the web is used as a bottom face
(3) Equally strong in (1) and (2)
(4) Not possible to state which of the above statement is correct

10. **Assertion A**: According to IS: 456; over reinforced sections are not permitted.

Reason R: There is ductile failure of over reinforced section.

Select your answer based on the coding system given below-

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true and R is not the correct explanation of A
(3) A is true but R is false
(4) A is false but R is true

11. The phenomenon of decreased resistance of material due to reversal of stress is called-

(1) Creep
(2) Fatigue
(3) Resilience
(4) Plasticity

12. Resins are-

(1) Not soluble in water
(2) Soluble in spirit
(3) Used in Varnishes
(4) Left behind on evaporation of oil

13. The two main gases obtained from anaerobic decomposition are-

(1) Ammonia and CO_2
(2) CO_2 & CH_4
(3) CH_4 & Hydrogen sulphide
(4) Ammonia and CH_4

14. If a radius of curvature of a simple curve is 229.2 m, then its degree of curvature is-

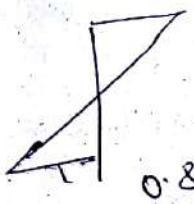
(1) 2°
(2) 3°
(3) 5°
(4) 10°

15. Match the following-

	List I		List II
(A)	Hardness	(i)	Winkler method
(B)	Chlorine	(ii)	EDTA method
(C)	DO	(iii)	Orthotolidine test
(D)	Chloride	(iv)	Mohr method

Codes-

	(A)	(B)	(C)	(D)
(1)	(ii)	(iii)	(i)	(iv)
(2)	(ii)	(iv)	(i)	(iii)
(3)	(i)	(iii)	(ii)	(iv)
(4)	(i)	(iv)	(ii)	(iii)



16. As per IS:456 the value of f_y at outermost tension fiber is-

(1) $0.02 + (f_y/1.5\ E_s)$
(2) $0.0035 + (f_y/1.5E_s)$
(3) $0.002 + (f_y/1.15E_s)$
(4) $0.002 + (f_y/1.5E_s)$

17. The conditions required to be satisfied for the analysis of indeterminate structure are-

(1) Equilibrium
(2) Compatibility
(3) Force-displacement relationship
(4) All of these

18. In slope deflection method, the joints are considered rigid when-

(1) no change in value of the angles between members
(2) 90° angle between the members in frame
(3) 180° angle between the members in beams
(4) all of these

19. The most suitable equipment for compacting clayey soils is a-

(1) Smooth wheeled roller
(2) Pneumatic tyred roller
(3) Sheeps foot roller
(4) Vibrator

20. Bullet proof glass is made of thick glass sheet sandwiched by a layer of-

(1) Steel
(2) Stainless steel
(3) Vinyl plastic
(4) Chromium plate

21. An unsupported excavation is made to the maximum possible depth in a clay soil having $\gamma_t = 18$ kN/m^3, C=100 kN/m^2; $\phi = 30°$. The active earth pressure, according to Rankin's theory, at the base level of excavation is-

(1) 115.47 kN/m^2
(2) 54.36 kN/m^2
(3) 27.18 kN/m^2
(4) 13.25 kN/m^2

22. A beam of uniform strength contains same-

(1) Bending Moment
(2) Bending stress
(3) Deflection
(4) Stiffness

23. The vertical member used in door frame is called-

(1) Post
(2) Hanging style
(3) Sill
(4) Rail

24. In the simplified design of angle iron purlins, which one of the following assumption would not be valid-

(1) Load component acting normal to the slope is considered
(2) Bending moment about the minor axis is considered
(3) Allowable bending stress is not reduced
(4) Slope of the roof should not exceed 30°

25. Consider the following impurities-

(i) CO_2 and H_2S
(ii) Finely divided suspended matter
(iii) Disease causing bacteria
(iv) Excess alkalinity

The correct sequence of the removal of these impurities in a water treatment plant is-

(1) (i) (ii) (iii) (iv)
(2) (i) (iv) (iii) (ii)
(3) (i) (iv) (ii) (iii)
(4) (iv) (i) (iii) (ii)

26. Neoprene is suitable for use in-

(1) Joinery work
(2) Floors of dance halls
(3) Bearing of bridges
(4) Hard duty rubber coating of floors

27. Drops are provided in flat slabs to resist-

(1) thrust
(2) bending moment
(3) torsion
(4) shear

28. List I lists tools/instruments while List II lists the method of surveying. Match the tool/instrument with the corresponding method of surveying.

	List I		List II
P.	Alidade	(i)	Chain surveying
Q.	Arrow	(ii)	Levelling
R.	Bubble tube	(iii)	Plane table surveying
S.	Stadia hair	(iv)	Theodolite surveying

	P	Q	R	S
(1)	(iii)	(ii)	(i)	(iv)
(2)	(ii)	(iv)	(iii)	(i)
(3)	(i)	(ii)	(iv)	(iii)
(4)	(iii)	(i)	(ii)	(iv)

29. A catchment area of 60 ha has a run off coefficient of 0.40. If a storm of intensity 3 cm/h and duration longer than the time of concentration occurs in the catchment, then what is the peak discharge?

(1) 2.0 m^3/s
(2) 3.5 m^3/s
(3) 4.5 m^3/s
(4) 2.5 m^3/s

30. The property of the ingredients to separate from each other while placing the concrete is called-

(1) Segregation
(2) Compaction
(3) Shrinkage
(4) Bulking

31. The first observation taken on turning point is-

(1) Back sight
(2) Foresight
(3) Intermediate sight
(4) None of the above

32. The Pensky-Martens apparatus are used for conducting the test on bitumen for testing-

(1) Fire point
(2) Ductility
(3) Viscosity
(4) Penetration

33. Undisturbed tests are required for conducting-

(1) Hydrometer Test
(2) Shrinkage Limit Test
(3) Consolidation Test
(4) Specific Gravity Test

34. The standard meridian of India is-

(1) 35°
(2) 82°30'
(3) 67°30'
(4) 120°

35. Lacustrine soils are obtained from-

(1) River
(2) Glaciers
(3) Sea
(4) Lake beds

36. A waste water sample of 2 ml is made upto 300 ml in BOD bottle with distilled water. Initial DO of the sample is 8 mg/ℓ and after 5 days it is 2 mg/ℓ. What is its BOD?

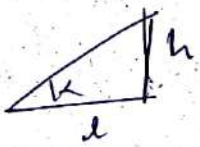
(1) 894 mg/ℓ
(2) 900 mg/ℓ
(3) 300 mg/ℓ
(4) 1200 mg/ℓ

37. Khosla's formula for assessing pressure distribution under weir floors are based on-

(1) Potential flow in permeable layers just beneath the floors
(2) Boundary layer flow with pressure drop longitudinally
(3) Conformal transformation of potential flow into the W plane
(4) Simplification of 3-D flow

38. When (h) is the difference in heights between the extremities of a chain length (ℓ) then the correction for the slope required is-

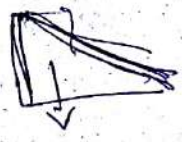
(1) h/ℓ
(2) h^2/ℓ
(3) $h^2/2\ell$
(4) $h/2\ell$



39. Bulking of sand is maximum if moisture content is about-

(1) 2%
(2) 4%
(3) 5%
(4) 10%

40. Force considered for the analysis of an elementary profile of a gravity dam under empty reservoir condition are-

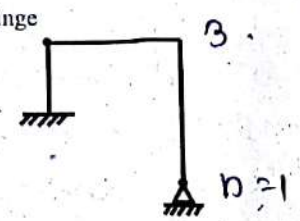


(1) Uplift pressure
(2) Water pressure
(3) Self-weight
(4) Wave pressure

41. The working conditions in Imhoff tanks are-

(1) aerobic only
(2) anaerobic only
(3) aerobic in lower compartment and anaerobic in upper compartment
(4) anaerobic in lower compartment and aerobic in upper compartment

42. For the plane frame as shown in the figure, the degree of kinematic indeterminacy neglecting axial deformation, is-



(1) 3
(2) 5
(3) 7
(4) 9

43. A bull nose brick is not used for-

(1) Rounding off sharp corners
(2) Pillars
(3) Decoration purpose
(4) Arches

44. Tacheometry is adopted where-

(1) Too many curves exists at the border
(2) Obstacles, undulation exists
(3) Limitation of space exists
(4) None of the above

45. Which of the following sewage treatment methods has inherent problems of odour, ponding and fly nuisance?

(1) UASB system
(2) Activated sludge process
(3) Trickling filters
(4) Stabilization ponds

46. In a transit theodolite, and incidental error due to eccentricity of Verniers is primarily encountered by-

(1) Reading both the verniers
(2) Reading different part of main scale
(3) Reading right and left faces
(4) Taking both right swing readings

47. In case of two way slab, the limiting deflection of the slab is-

(1) Primarily a function of the long span
(2) Primarily a function of the short span
(3) Independent of long or short spans
(4) Dependent on both long and short spans

48. Maxwell's reciprocal theorem in structural analysis-

(1) is true for any structure obeying Hooke's law
(2) can be applied to the rotations caused by flexure, shear or torsion
(3) is useful in analyzing indeterminate structures
(4) all of these

49. A person standing on the bank of a canal drops a stone on the water surface. He notices that the disturbances on the water surface is not travelling upstream. This is because the flow in the canal is-

(1) Sub-critical (2) Super-critical

(3) Steady (4) Uniform

50. Two beams of same material have equal cross-sectional area. If one beam has square cross-section and the other has circular cross section-

(1) Both the beam will be equally strong (2) Circular section will be stronger

(3) Square section will be stronger (4) Strength depends on loading condition

51. Consider the following statements-

I- The economic spacing of a roof truss depends on cost of purlins and cost of roof covering.

II- Purlins provided over roof trusses are designed as a continuous as per IS:800.

III- Bearing stiffeners are provided in a plate girder to prevent web buckling.

The correct statements are-

(1) I, II and III are correct (2) Only I and III are correct

(3) II and III are correct (4) I and II are correct

52. Excess of silica in the clay-

(1) Makes the brick brittle & weak (2) Changes the colour of brick from red to yellow

(3) Improves impermeability and durability of the brick (4) Makes the brick crack and wrap on drying

53. The tendency of a stone is, to split along-

(1) Texture (2) Fracture

(3) Cleavage (4) Structure

54. The R.L. of the point 'A' which is on floor is 100m and back sight reading on 'A' is 2.445m. If the foresight reading on the point 'B' which is on ceiling is 2.745m, the R.L. of point 'B' will be-

(1) 94.80 m (2) 99.71 m

(3) 100.29 m (4) 105.20 m

55. A prismatic member with area of cross section 'A' is subjected to a tensile load 'P', then the maximum shear stress and its inclination with the direction of load respectively are-

(1) P/A and 60° (2) P/2A and 45°

(3) P/2A and 60° (4) P/A and 45°

56. The following characteristics pertain to the sand filters used in the water industry:

I. Filtration rate is 1 to 4 $m^3/(m^2\ day)$

II. Typical duration of operation in one run is 24 to 72 hours

III. Operation cost is low

Which of the above characteristics pertain to slow sand filters?

(1) I, II and III (2) I and II

(3) II and III (4) I and III

57. It is a common practice to design a highway to accommodate traffic volume corresponding to-

(1) 30^{th} hour (2) Peak hour

(3) ADT (4) 15-min peak hour

58. As per IRC guidelines for designing flexible pavements by CBR method, the load parameter required is-

(1) number of commercial vehicles per day (2) cumulative standard axles in msa

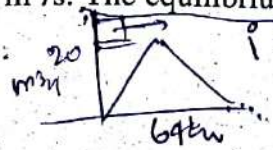
(3) equivalent single axle load (4) number of vehicles (all types) during design life

59. As per IS: 456-2000, the final deflection due to all loads including the effects of temperature, creep and shrinkage and measured from the as-cast level of the supports of floors, roofs and all other horizontal members, should not normally exceed-

(1) span/250 (2) span/350

(3) 20 mm (4) Both (2) and (3)

60. A 8 hours unit hydrograph of catchment is triangular in shape with a base width of 64 hours and peak ordinate of 20 m^3/s. The equilibrium discharge of S-curve obtained by using this 8 hours unit hydrograph is-



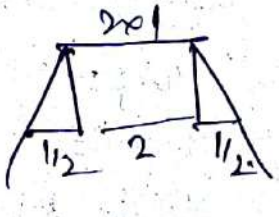
(1) 60 m^3/s (2) 80 m^3/s

(3) 100 m^3/s (4) 800 m^3/s

61. A footing of 2m × 1m exerts a uniform pressure of 150 kN/m^2 on the soil. Assuming a load dispersion of 2 vertical to 1 horizontal, the average vertical stress (kN/m^2) at 1.0 m below the footing is-

(1) 75 (2) 80

(3) 50 (4) 100



62. The earth pressure behind a bridge abutment is-

(1) Active (2) Passive

(3) At rest (4) Constant always and everywhere

63. Match list I (Test) with list II (property) and select the correct answer-

	List I		List II
A.	Proctor test	(i)	Grain size analysis
B.	Vane test	(ii)	Shear strength
C.	Penetration test	(iii)	Bearing capacity
D.	Hydrometer test	(iv)	Compaction

	A	B	C	D
(1)	(ii)	(iv)	(i)	(iii)
(2)	(iv)	(ii)	(i)	(iii)
(3)	(iv)	(ii)	(iii)	(i)
(4)	(ii)	(iv)	(iii)	(i)

64. In a counterfort retaining wall, the main reinforcement is provided on the-

(i) Bottom face in front counterfort
(ii) Inclined face in front counterfort
(iii) Bottom face in back counterfort
(iv) Inclined face in back counterfort

The correct answer is-

(1) (i) and (ii)
(2) (ii) and (iii)
(3) (i) and (iv)
(4) (iii) and (iv)

65. Tie bars in CC roads are at-

(1) Expansion joints
(2) Contraction joints
(3) Warping joints
(4) Longitudinal joints

66. 70% index of wetness means-

(1) Rain excess of 30%
(2) Rain deficiency of 30%
(3) Rain deficiency of 70%
(4) None of the above

67. For a floating body to be in stable equilibrium, its metacenter should be-

(1) Below the center of gravity
(2) Below the center of buoyancy
(3) Above the center of buoyancy
(4) Above the center of gravity

68. The maximum diameter that a capillary tube can have to ensure that a capillary rise of atleast 6 mm is achieved when the tube is dipped into a body of liquid with surface tension = 0.08 N/m and density = 900 kg/m^3, is-

(1) 3 mm
(2) 6 mm
(3) 5 mm
(4) 8 mm

69. The diameter of needle in Vicat apparatus for initial setting time is-

(1) 0.5 mm
(2) 1 mm
(3) 5 mm
(4) 10 mm

70. As per IS:800, the maximum bending moment of purlin is-

(1) WL/6
(2) WL/8
(3) WL/4
(4) WL/10

Where- W = udl; L = Span of purlin

71. A traffic rotary is justified where-

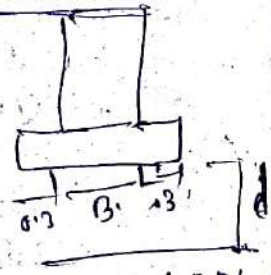
(1) Number of intersecting roads is between 8 &10
(2) Space is limited and costly
(3) When traffic volume is > 6000 vehicles/hr
(4) When traffic volume is having lowest limit of 500 vehicles per hour

72. The overflowing sheet of water on a weir is called-

(1) Head
(2) Nappe
(3) Upstream
(4) Crest

73. In a plain concrete pedestal of M35 grade, the maximum bearing pressure at the base is found to be 40N/mm^2. Find the depth of footing, if the projection beyond the column is 300 mm.

(1) 3.1 m
(2) 2.6 m
(3) 2.4 m
(4) 1.9 m



74. Most common method of pre-stressing used for factory production is-

(1) Long line method
(2) Freyssinet system
(3) Magnel-Blaton system
(4) Lee-McCall system

75. The windblown soils are associated with-

(1) Alluvial soil
(2) Lateritic soil
(3) Loess
(4) Black Cotton soil

76. The detention time for a water sedimentation tank using coagulated raw supplies may vary between-

(1) 1 to 2 hours
(2) 2 to 4 hours
(3) 4 to 8 hours
(4) 16 to 24 hours

77. The dilatancy correction in Standard Penetration Test (SPT) is given by-

(1) $N' = 15 + (N - 15)$
(2) $N' = 15 + \frac{1}{2}(N - 15)$
(3) $N' = 15 + \frac{1}{2}(N - 10)$
(4) $N' = 15 + (N - 10)$

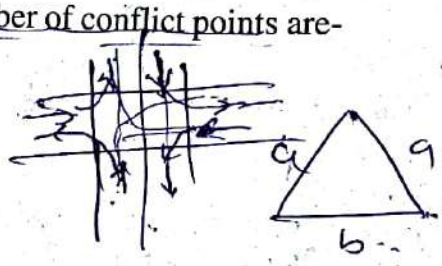
78. An isobar is a line which connects all points below the ground surface at which-
(1) The local ground elevation is same
(2) The settlement is same
(3) The vertical stress is same
(4) The ground elevation is varying

79. Methemoglobinemia or blue baby is caused due to-
(1) Chlorides
(2) Fluorides
(3) Nitrates
(4) Sulphides

80. In India which technology is highly adopted for fluoride removal?
(1) Aeration
(2) Lime soda technique
(3) Nalgonda Method
(4) Ozonation

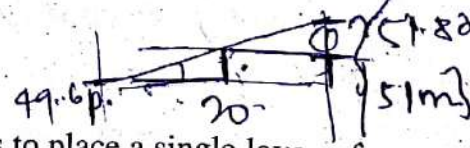
81. RC – 2; MC-2 and SC-2 correspond to-
(1) Same viscosity
(2) Viscosity in increasing order from RC-2 to SC-2
(3) Viscosity in decreasing order from RC-2 to SC-2
(4) None of the above

82. On a right angled road intersection with two way traffic, the total number of conflict points are-
(1) 32
(2) 16
(3) 24
(4) 4



83. The shape factor of an isosceles triangle should be-
(1) 1.5
(2) 1.7
(3) 2.34
(4) 2

84. The Reduced Levels (RLs) of the points P and Q are +49.600 m and + 51. 870 m respectively. Distance PQ is 20 m. The distance (in m from P) at which the +51.00 m contour cuts the line PQ is-
(1) 15.00 m
(2) 12.33 m
(3) 3.52 m
(4) 2.27 m



85. The general requirement in constructing a reinforced concrete road is to place a single layer of reinforcement-
(1) Near the bottom of the slab
(2) Near the top of the slab
(3) At the middle
(4) Equally distributed at the top and the bottom

86. Hydraulic lime is obtained by-
(1) Fly ash
(2) Burning of kankar
(3) Red stone
(4) Calcination of pure clay

87. Steps which are normally triangular in shape are called-
(1) Angular steps
(2) Radial steps
(3) Winders
(4) Spiral steps

88. For a transition curve, the shape recommended by IRC is-
(1) Spiral
(2) Lemniscate
(3) Cubic parabola
(4) All of these

89. Asphalt concrete is a mix comprising of-

(1) Fine aggregate, mineral filler and bitumen

(2) Fine aggregate and bitumen

(3) Coarse aggregate, fine aggregate, mineral filler and bitumen

(4) Coarse aggregate, mineral filler and bitumen

90. For the overall cost of roof trusses to be minimum, the cost of trusses should be equal to-

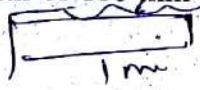
(1) twice the cost of purlins plus the cost of roof coverings

(2) twice the cost of roof coverings plus the cost of purlins

(3) the cost of roof coverings plus the cost of purlins

(4) twice the cost of purlins plus twice the cost of roof coverings

91. The intensity of u.d.l. which, when it acts over the entire span of 1m of a cantilever beam of rectangular cross-section of width of 100 mm and depth 200 m, would produce a maximum shear stress of 1.5 N/mm^2, is-



(1) 30 kN/m

(2) 26.6 kN/m

(3) 20 kN/m

(4) 36.6 kN/m

92. For a road with camber of 3% and the design speed of 80 km/hr, the minimum radius of the curve beyond which no super-elevation is needed is-

(1) 1680 m

(2) 944 m

(3) 406 m

(4) 280 m

93. A horizontal water jet with a velocity of 10 m/s and cross-sectional area of 10 mm^2 strikes a flat plate held normal to the flow direction. The density of water is 1000 kg/m^3. The total force on the plate due to the jet is-

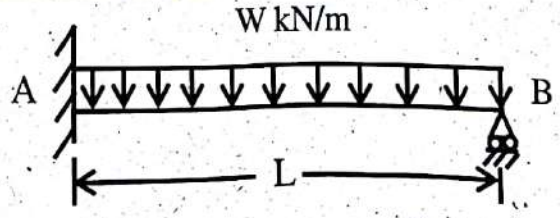
(1) 100 N

(2) 10 N

(3) 0.1 N

(4) 1 N

94. In the propped cantilever beam carrying a uniformly distributed load of WN/m, shown in the following figure, the reaction at the support B is-



(1) $\frac{5}{8}$WL

(2) $\frac{3}{8}$WL

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

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

95. A queen closer is a-

(1) Brick laid with its length parallel to the face or direction of wall.

(2) Brick laid with its breadth parallel to the face or direction of wall.

(3) Brick having the same length and depth as the other bricks but half the breadth.

(4) Brick with half the width at one end and full width at the other.

96. The shape of the STOP sign according to IRC: 67-2001 is-

(1) Circular

(2) Triangular

(3) Octagonal

(4) Rectangular

97. The bulk modulus of K, modulus of elasticity E and Poisson's ratio is $\frac{1}{m}$ then which of the following is true-

(1) $E = 3K\left(1+\frac{2}{m}\right)$

(2) $E = 3K\left(1-\frac{1}{m}\right)$

(3) $E = 3K\left(1-\frac{2}{m}\right)$

(4) $E = 3K\left(1+\frac{1}{m}\right)$

98. A trapezoidal channel is 10.0 m wide at the base and has a side slope of 4 horizontal to 3 vertical. The bed slope is 0.002. The channel is lined with smooth concrete (Manning's N = 0.012). The hydraulic radius (in m) for a depth of flow of 3 m is-

(1) 20.0

(2) 3.5

(3) 3.0

(4) 2.1

99. For pipes, turbulent flow occurs when Reynolds number is-

(1) Less than 2000

(2) Between 2000 and 4000

(3) More than 4000

(4) None of the above

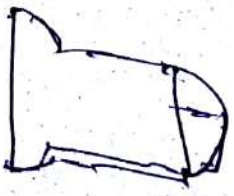
100. For a given shear force across a symmetrical 'I' section, the intensity of shear stress is maximum at the-

(1) junction of the flange and the web, but on web.

(2) junction of the flange and the web, but on the flange.

(3) centroid of the section

(4) extreme fibres



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