TPSC JE Gr-VA

Previous Year Paper
(Civil)
08 Oct, 2023

DO NOT OPEN THIS TEST BOOKLET TILL YOU ARE ASKED TO DO SO.

TR/SET/CIVIL/PRE/DEGREE/2023

Test Booklet Series

TEST BOOKLET

GENERAL STUDIES &
ENGINEERING APTITUDE

A

_____
(Signature of the Candidate)

_____
(Invigilator's Signature)

Time Allowed – 2 hours (Two hours)   **Maximum Marks – 100**

INSTRUCTIONS

1. PLEASE CHECK. THE TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. **ENCODE CLEARLY THE TEST BOOKLET SERIES A,B,C OR D AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET BY BLACK BALL POINT PEN ONLY.**

3. This Test Booklet contains 100 items (questions). Each question has four responses (answers). You will select the responses which you want to make on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the most appropriate. In any case, choose ONLY ONE response for each item.

4. You have to mark all your responses ONLY on the separate Answer Sheet provided. See directions in the Answer Sheet.

5. All items carry equal marks.

6. Before you proceed to mark in the Answer Sheet the responses to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instruction sent to you with your Admission Certificate.

7. After you have completed filling in responses on the Answer sheet and the Examination is completed, you should handover the Answer Sheet to the Invigilator only. You are permitted to take away the Test Booklet.

8. Sheets for rough work are appended on the Test Booklet at the end.

9. **Penalty for wrong answers :**

   (a) There will be four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-fourth** of the marks assigned to that question will be deducted as penalty.

   (b) If a candidate gives more than one answer, it will be treated as a **Wrong Answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

   (c) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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Four options are given against each of the following questions. Select the correct option from the four options and encode it in the Answer Sheet by using **Black Ball Point Pen** only as per example given below :

Example : P : Aunt Polly wanted to trap Tom ———— damaging confessions.

(A) into   (B) with   (C) by   (D) on

Example Q : Let's watch ——— movie ; I mean 'Pather Panchali'.

(A) a   (B) an   (C) the   (D) No article is needed

PART – A

Direction for Question Nos. 1 to 4.

Choose the most appropriate preposition/ article to fill in the blanks.

1. Mosquitoes breed _____ stagnant water.

(A) in   (B) on

(C) into   (D) under

2. He has a shop in the market where he deals ____ wheat.

(A) with   (B) in

(C) at   (D) of

3. What did you do with ____ camera, I lent you ?

(A) a   (B) an

(C) the   (D) no article is neaded

4. Bring me _____ umbrella that is lying on the bed.

(A) an

(B) the

(C) a

(D) No article is needed

Direction for Question Nos. 5 and 6.

Choose from the given options/words opposite in meaning to the underlined words in the following sentences :

5. He spares no <u>pain</u> to come out of this problem.

(A) Doubt

(B) Pleasure

(C) Anger

(D) Hesitation

6. He <u>confessed</u> that he had stolen the money.

(A) Denied

(B) Refused

(C) Opposed

(D) Reacted

Direction for Question Nos. 7 and 8.

Choose the most appropriate Synonym for the underlined words in the sentences :

7. Oil is one of the <u>principal</u> sources of energy.

(A) most expensive

(B) most important

(C) most difficult

(D) most popular

8. The road will be closed until the <u>blizzard</u> ends.

(A) snowstorm

(B) hurricane

(C) tornado

(D) thunderstorm

Direction for Question Nos. 7 and 8.

The underlined and lettered parts of each sentence below may contain and error in grammar, usage, words choice (diction), or expression (idiom). Read each sentence carefully and identify which item, if any, contains an error. If it contains no error, answer is D.

9. <u>I hope</u>   you'll come   <u>in</u> Spain   <u>soon.</u>   <u>No error</u>
   A   B   C   D

   (A) I hope   (B) in

   (C) soon   (D) No error

10. <u>I shall</u> buy <u>one of</u> the radios <u>that is</u> on sale.   <u>No error</u>
    A   B   C   D

    (A) I shall   (B) one of

    (C) that is   (D) No error

11. 'Sethusamudram Project' will connect the Palk strait with

    (A) Gulf of Khambat   (B) Gulf of Kutch

    (C) Gulf of Mannar   (D) None of these

12. What is 'Angel Tax'?

    (A) Tax on sales   (B) Tax on individual income

    (C) Tax on Capital Gains   (D) Tax on startups

13. What is 'Saharsh' initiative of Tripura Government ?

(A) Education drive for sanitation workers

(B) To encourage social and emotional learning in children

(C) Financial help for poor

(D) Drive against child marriages

14. Which institution is a watchdog for money laundering and terror financing and issues 'Grey List' ?

(A) WHO (B) IMF

(C) FATF (D) WTO

15. Which institution has commissioned India's first green hydrogen blending project ?

(A) ONGC (B) GAIL

(C) NTPC (D) IOL

16. Which State of India has become country's Fully Digital Banking according to SLBC ?

(A) Kerala (B) Assam

(C) Uttar Pradesh (D) Punjab

17. The Tripura Merger Agreement was signed in New Delhi on

(A) 15th October, 1949 (B) 15th August 1947

(C) 9th September, 1949 (D) 26th November 1949

18. Who abolished Slavery from Tripura ?

   (A) Maharaja Radhakrishore Manikya   (B)   Maharaja Bir Chandra Manikya

   (C) Maharaja Dhanya Manikya   (D)   Maharaja Birendra Kishore Manikya

19. India won the Under-19 Women's T-20 World Cup Cricket Championship in January, 2023 by beating

   (A) Pakistan   (B)   England

   (C) Australia   (D)   South Africa

20. Who was the Chief Guest in India's Republic Day Celebration - 2023 in New Delhi ?

   (A) Prime Minister of England   (B)   President of France

   (C) Prime Minister of Nepal   (D)   President of Egypt.

21. Find the ratio of critical load of column A and B having length 2m and 4m respectively and of similar support condition at the ends. The diameter of column A and B is 100 mm and 200 mm respectively. Other details are the same for both the columns.

(A) 1

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

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

(D) $\frac{1}{8}$

22. Two people weighing W each are sitting on a plank of length L floating on water at L/4 from either end. Neglecting the weight of the plank, the bending moment at the center of the plank is

(A) WL/8

(B) WL/16

(C) WL/32

(D) Zero

23. The tolerance for concrete cover as per IS 456-2000 in construction is

(A) ± 5 mm

(B) ± 10 mm

(C) 0 to + 5 mm

(D) 0 to + 10 mm

24. The design of nominal strength of filter weld as per IS 800-2007 is given by

(A) $f_y / \sqrt{3}$

(B) $f_u / 2$

(C) $f_y / 3$

(D) $f_u / \sqrt{2}$

25. As per IS 456-2000 the elastic modulus of concrete is expresed as (fck = characteristic strength of concrete). All units are in MPa.

(A) $5700 \sqrt{f_{ck}}$

(B) $5000 \sqrt{f_{ck}}$

(C) $570 \sqrt{f_{ck}}$

(D) $500 \sqrt{f_{ck}}$

26. The minimum tension reinforcement in a beam for Fe500 grade steel is

(A) 0.12%

(B) 0.15%

(C) 0.17%

(D) 0.20%

27. A body of dimension 2m × 2m × 2m weighs 800 kg in water (fully submerged). What is its specific gravity ?

(A) 1.001

(B) 1.01

(C) 1.1

(D) 1.11

28. The expansion of Portland Cement is caused by

(A) Alumina

(B) Iron oxide

(C) Free Silica

(D) Free lime

29. In a circular sewer of diameter D running full, the hydraulic radius is given by

(A) D

(B) D/2

(C) D/3

(D) D/4

30. In a sedimentation tank of Length = L, width = B, and depth = D, the settling velocity of a particle for the discharge Q is given by

(A) Q/LB

(B) Q/LD

(C) Q/BD

(D) Q/D^2

31. The flow in an open channel is super critical if Froude number is

(A) Less than 1

(B) Greater than 1

(C) Less than 2

(D) Greater than 2

32. When 1 cm on a map represents 10m on the ground, then the representative scale is expressed as

(A) 1 : 10

(B) 1 : 100

(C) 1 : 1000

(D) 1 : 10000

33. The maximum bending moment in a cantilever beam (span = L) subjected to a moment M at the free end is

(A) M

(B) ML

(C) M/L

(D) M/2

34. The minimum number of longitudinal bar in a Circular reinforced concrete column is

(A) 10

(B) 8

(C) 6

(D) 4

35. The condition of no tension at the masonry wall design at a section is (e = eccentricity of resultant force, b = width at section)

(A) e = b/2

(B) e = b/3

(C) e = b/4

(D) e = b/6

36. A soil sample has water content = 30%, Liquid limit = 60% and Plastic limit = 25%. The value of plasticity index is

(A) 30%

(B) 5%

(C) 45%

(D) 65%

37. Initial strength of concrete is due to

(A) C_3A (B) C_3S

(C) C_2S (D) C_4AF

38. A body is subjected to two normal stresses 20 kN/m² (tensile) and 10 kN/m² (compressive) acting perpendicular to each other. The maximum shear stress is

(A) 5 kN/m²   (B) 10 kN/m²

(C) 15 kN/m²   (D) 20 kN/m²

39. A retaining wall with smooth vertical back retaining a horizontal back fill of dry density γ, cohesion c and angle of friction Φ. The depth at which the pressure will be zero is given by

(A) $(c / \gamma)\ \tan(45 + \Phi / 2)$ (B) $(2c / \gamma)\ \tan(45 + \Phi / 2)$

(C) $(3c / \gamma)\ \tan(45 + \Phi / 2)$ (D) $(4c / \gamma)\ \tan(45 + \Phi / 2)$

40. A soil sample has a porosity of 20%. The specific gravity of solid is 2.0. The dry density of the solid is

(A) 1.6 kg/m³   (B) 1.66 kg/m³

(C) 1.11 kg/m³   (D) 2.5 kg/m³

41. A retaining wall of 4m height has smooth vertical surface. The back fill has a horizontal surface at top of the wall. The unit weight of back fill is 18 kN/m³. Its angle of shearing resistance is 30 degree and cohesion is zero. There is uniformly distributed surcharge load of 36 kN/m². Find the maximum pressure on the wall.

(A) 24 kN/m²   (B) 36 kN/m²

(C) 72 kN/m²   (D) 154 kN/m²

42. If an axial tensile force P is suddenly applied at the free end of a prismatic bar fixed at the other end (area of cross-section = A) the maximum stress developed is

(A) P/A

(B) 1.5 P/A

(C) 2 P/A

(D) 2.5 P/A

43. The clinker is formed at temperature in cement manufacturing process is

(A) 500°C

(B) 1000°C

(C) 1200°C

(D) 1500°C

44. The probabilistic time in for compilation of an activity in PERT is given by (t_o = optimistic time, t_m = Most probable time and t_p = Pessimistic time)

(A) $(t_o + t_m + t_p)/3$

(B) $(t_o + 2t_m - t_p)/4$

(C) $(t_o + 3t_m - t_p)/5$

(D) $(t_o + 4t_m - t_p)/6$

45. In a sedimentation tank (L = Length, B = Width of the tank and D = Height of the tank), the settling velocity of a particle for discharge Q is given by

(A) Q/(BD)

(B) Q/(LD)

(C) Q/(LB)

(D) Q/(2L)

46. The temporary hardness of water is not caused by

(A) Calcium carbonate

(B) Magnesium bi carbonate

(C) Magnesium carbonate

(D) Magnesium sulphate

47. For 15 mm thick cement plastering 1 : 6 on 100 sq.m new brick work, the quantity of cement required is

(A) 0.200 m³   (B) 0.247 m³

(C) 0.267 m³   (D) 0.343 m³

48. Two springs of stiffness K1 and K2 connected in series. Find the equivalent stiffness of the two springs

(A) K1 + K2   (B) (K1 + K2)/ K1 K2

(C) K1 K2 / (K1 + K2)   (D) (1 / K1) + (1 / K2)

49. Which of the following section in steel structures should be preferable to be used at places where torsion occurs in a structural member ?

(A) angle   (B) channel

(C) box section   (D) Tee section

50. The loss of stress in cables with time at constant strain is called

(A) Creep   (B) Shrinkage

(C) Ductility   (D) Relaxation

51. The relationship between the transition length 'L', and radius 'r' of an ideal transition curve is given by

(A) L α1/r   (B) L α1/r²

(C) L α r   (D) L α r²

52. A city generates 40×10^6 kg of Municipal Solid Waste (MSW) per year, out of which 10% is recovered/recyclable and the rest goes to landfill. The landfill has a single lift of 3m height and is compacted to a density of 550 kg/m³. If 80% of the landfill is assumed to be MSW, the landfill area (in 2m, up to one decimal place) required would be

(A) 27272.2 sqm

(B) 29282.2 sqm

(C) 3030.2 sqm

(D) 3232.1 sqm

53. The population for a city in 1981, 1991, 2001 and 2011 was recorded (in thousands) as 80, 106, 140 and 170 respectively. The population forecast for the year 2025 using Arithmetic increase method is

(A) 2,05,000

(B) 2,12,000

(C) 2,15,000

(D) 2,35,000

54. A city is having population of 2.5 lakh and per capita water demand as 160 Ipcd. Assuming daily peak factor as 1.8 and hourly peak factor as 1.5, peak hourly water demand for the city is

(A) 4500 m³/h

(B) 4200 m³/h

(C) 3000 m³/h

(D) 1666 m³/h

55. As per IS 456-2000, the nominal mix concrete may be used for concrete of grade ?

(A) up to M15

(B) up to M20

(C) up to M25

(D) up to M30

56. What is the weight of 10 meter long 12 mm dia steel bar ?

(A) 0.89 kg

(B) 0.99 kg

(C) 8.9 kg

(D) 9.9 kg

57. A flow of discharge 5.0 m³/sec is passing at a depth of 2.0m through a rectangular channel of width 2.5m. What is the specific energy of the flow ? (g = 10 m/sec²)

(A) 2.05 m

(B) 2.5 m

(C) 1.95 m

(D) 1.5 m

58. Number the zero-force member in the truss
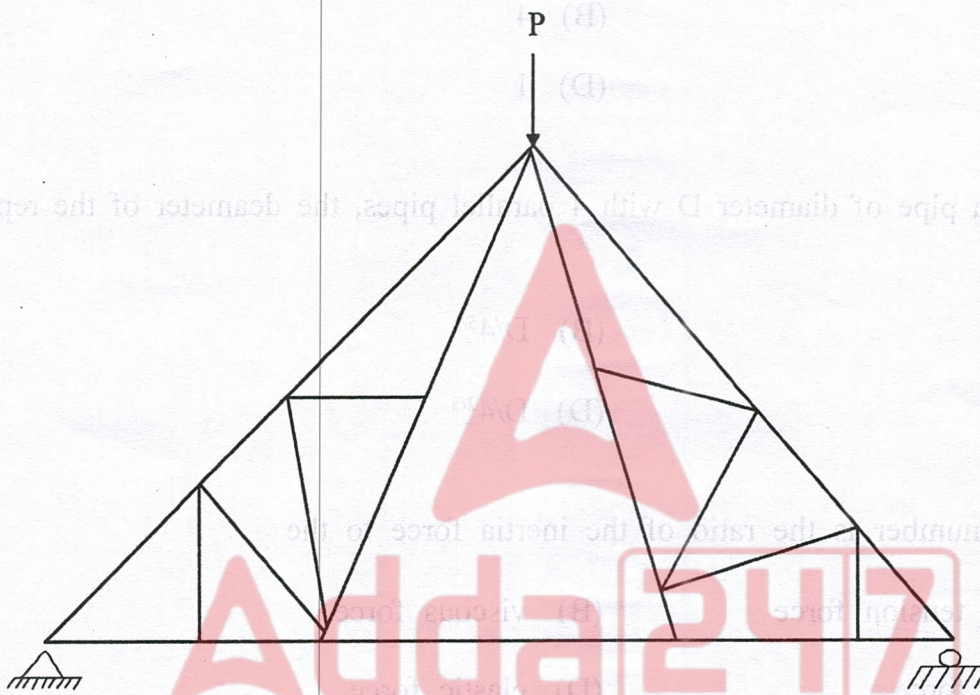
(A) 4

(B) 6

(C) 8

(D) 10

59. The relations between Lacy's silt factor (f) and the mean regime velocity (v) is

(A) f α V

(B) f α 1/V

(C) f α V²

(D) f α 1/V²

60. If [K] is the stiffness matrix, [S] is the flexibility matrix, Then the product [K] [S] is equal to [I] is the identity matrix ?

(A) 0

(B) [I]

(C) 2[I]

(D) 4[I]

61. Suppose structure has static Indeterminacy of 3 and Kinematic indeterminacy of 4. How many degrees of freedom should be constrained to solve it using displacement method of structure analysis ?

(A) 3

(B) 4

(C) 7

(D) 1

62. To replace a pipe of diameter D with 4 parallel pipes, the deameter of the replaced pipe is

(A) $D/4^{3/2}$

(B) $D/4^{5/2}$

(C) $D/4^{2/3}$

(D) $D/4^{2/5}$

63. Reynolds's number is the ratio of the inertia force to the

(A) surface tension force

(B) viscous force

(C) gravity force

(D) elastic force

64. Couple M is applied at B on a simply supported beam AC as shown in figure below. What is the maximum shear force for the beam ?
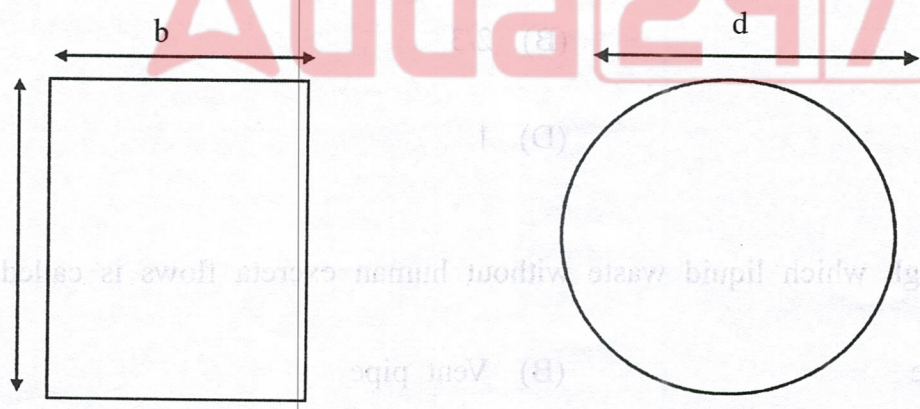

(A) Zero

(B) M

(C) 2 M/3

(D) M/3
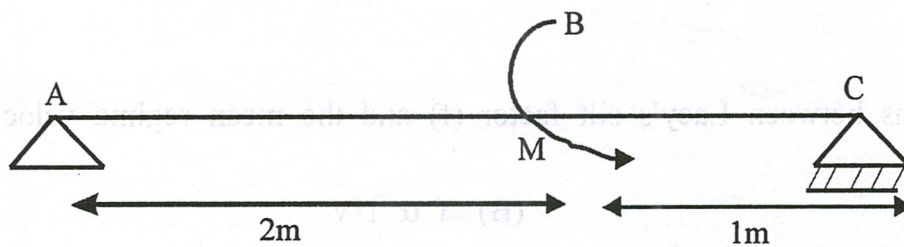
65. The chemical used to determine the COD in sewage is

(A) Potassium Dichromate   (B) Potassium Permanganate

(C) Potassium Sulphate   (D) Potassium Manganate

66. For a circular column having its ends hinged, the slenderness ratio is 160. The l/d ratio of the column is

(A) 80   (B) 57

(C) 40   (D) 20

67. Calculate the total thickness of the pavement if the CBR value of the soil is 7%, the wheel load is 4100 kg and the tyre pressure is 7 kg/cm^2.

(A) 2896 mm   (B) 28.96 cm

(C) 2896 cm   (D) 28.96 mm

68. If the finess modulus of sand is 2.5, it is graded as

(A) very fine sand   (B) fine sand

(C) medium sand   (D) coarse sand

69. According to IRC, the approaches on either side of the bridge should be straight for a minimum length of

(A) 100 m   (B) 50 m

(C) 20 m   (D) 15 m

70. The design speed on a highway is 60 kmph; calculate the super elevation if radius of curve is 150 m and coefficient of friction is 0.15.

(A) 0.15   (B) 0.04

(C) 0.038   (D) 0.07

71. As per IS 10500 : 2012, the permissible limit of total dissolved solids (in mg/l) in drinking water in the absence of an alternate source is

(A) 1000

(B) 500

(C) 200

(D) 2000

72. The back sight at station A (benchmark = 100 m) is 3.425 m and the foresight reading station B is 2.240 m. The RL of station B is

(A) 102.240 m

(B) 103.425 m

(C) 101.185 m

(D) 98.815 m

73. The instrument alidade is used in

(A) chain survey

(B) compass survey

(C) plane table survey

(D) levelling

74. The moment of Inertia of a square of side 'a' about its diagonal is

(A) $a^2/8$

(B) $a^3/12$

(C) $a^4/12$

(D) $a^4/16$

75. A horizontal curve is to be designed for a National highway in plain terrain with a design speed of 80 kmph. The maximum supper-elevation is 0.05 and the lateral coefficient of friction is 0.15. The ruling minimum radius of the curve as per IRC is

(A) 229 m

(B) 3200 m

(C) 252 m

(D) 280 m

76. A timber cantilever beam of length 4 m having cross-section 0.300×300 mm and modulus of elasticity 12000 GPa is loaded by a point load 'P' at free end. If vertical displacement of the free end is 8 mm, the maximum bending stress at the fixed end is

(A) 750 N/mm²

(B) 810 N/mm²

(C) 930 N/mm²

(D) 1100 N/mm²

77. Two columns P_1 and P_2 of different materials with elastic modulus 2×10^5 MPa and 1.8×10^5 MPa and $f_y = 250$ MPa and 160 MPa respectively are having same length and same cross-section. P1 is fixed at both ends and P2 is pinned at both ends. Ratio of buckling loads is

(A) 1.1

(B) 4.4

(C) 6.9

(D) 8.8

78. Two beams having rectangular and circular cross-section (see in figure below) respectively are having same length, allowable stress, bending moment and material. The ratio of weights of circular and rectangular beams is

(A) 2.4

(B) 0.4

(C) 2.8

(D) 1.4

79. The shear stress at the surface of a circular shaft under torsion is

(A) zero

(B) minimum

(C) maximum

(D) infinity

80. The unit of coefficient of permeability is

(A) m/sec

(B) N/sec

(C) m²/sec

(D) m³/sec

81. The response reduction factor as per IS 1893-2016 for special moment resisting frame structure will be

(A) 3

(B) 4

(C) 5

(D) 6

82. The ratio of 5 day BOD to Ultimate BOD is

(A) 1/3

(B) 2/3

(C) 3/4

(D) 1

83. A pipe through which liquid waste without human excreta flows is called

(A) Soil pipe

(B) Vent pipe

(C) Anti-syphonage

(D) Waste pipe

84. A column is to be designed which should be capable of carrying a design axial load of 300 kN. Taking design compressive stress as = 150 MPa, suggest a suitable section from the options given below. (Take Fe 410 grade of steel)

(A) Sectional area = 1460 mm², ISMB 100 @ 11.5 kg/m

(B) Sectional area = 1660 mm², ISMB 125 @ 13.0 kg/m

(C) Sectional area = 1900 mm², ISMB 150 @ 14.9 kg/m

(D) Sectional area = 2500 mm², ISMB 175 @ 19.6 kg/m

85. A rectangular beam cross-section having width as 400 mm and effective depth as 500 mm is subjected to a design torsional moment of 150 kNm and transverse shear force of 80 kN. If the spacing of the shear reinforcement provided is 150 mm, permissible shear is 0.36 N/mm² and grade of steel is Fe 415, the minimum area of total transverse reinforcement should be

(A) 176 mm²

(B) 225 mm²

(C) 364 mm²

(D) 505 mm²

86. In a combined footing carrying unequal loads, maximum hogging moment and maximum sagging occurs at

(A) face of heavier column and centre of footing

(B) centre of footing and section equidistant from both columns

(C) face of heavier column and section having zero shear force

(D) section having maximum shear force and face of heavier column.

87. A short circular RCC column of 400 mm diameter has 6 longitudinal bars of 20 mm diameter and 6 mm dia spiral reinforcement @ 40 mm pitch. Considering minimum eccentricity, grade of concrete as M30 and grade of steel in reinforcements as Fe 415, the design load carrying capacity of the circular column as per IS 456 : 2000 is

(A) 1890 kN

(B) 2032 kN

(C) 2134 kN

(D) 2366 kN

88. The tensile reinforcement in a RCC beam of size 300 mm × 400 mm consists of 4 numbers 16 mm diameter Fe 415 bars at a clear cover of 30 mm. The grade of concrete used is M25. Following are the statements regarding the above section designed by limit state method.

(A) The percentage of steel provided is 0.68%

(B) The section will fail by yielding of tension reinforcement first

(C) The section will fail by crushing of concrete first

(D) The moment of resistance of the section is 92 kN-m

Which of the above statements is correct ?

89. A 2 km long pipe of 0.2 m diameter connects two reservoirs. The difference between water levels in the reservoirs is 8 m. The Darcy-Weisbach friction factor is 0.04. Considering the frictional, entry and exit losses, the velocity in the pipe is

(A) 0.35 m/s   (B) 0.63 m/s

(C) 1.45 m/s   (D) 2.8 m/s

90. Consider the following :

(i) Froude number is ratio of interia force to viscous force

(ii) Weber number is ratio of interia force to surface tension force

(iii) Mach number is ratio of velocity of fluid to velocity of sound

(iv) Reynold's number is ratio of interia force to gravity force

Which of the above definitions is/are incorrect ?

(A) (ii), (iii)   (B) (i), (iv)

(C) (i), (ii), (iv)   (D) (i), (ii)

91. Water sample was tested and analyzed resulting in following observation was made

Ion	Equivalent weight	Concentration (mg/l)
Na^+	23	40
Ca^{+2}	20	60
$-K^+$	39	4
Mg^{+2}	12	14
$HCO_3{}^-$	61	150

The total hardness and non-carbonate hardness of water sample as $CaCO_3$ is

(A) 208, 85 mg/l   (B) 158, 74 mg/l

(C) 126, 0 mg/l   (D) 34, 0 mg/l

92. Standard and modified proctor test were conducted on a soil sample and the obtained values are tabulated as given below :

	Optimum moisture content	Maximum dry density
Standard proctor test	M1	D1
Modified proctor test	M2	D2

Which of the following relation is correct ?

(A) M1 < M2 and D1 > D2   (B) M1 > M2 and D1 < D2

(C) M1 > M2 and D1 > D2   (D) M1 < M2 and D1 > D2

93. The effective stress friction angle of a saturated cohesionless soil is 40°. Ratio of normal effective stress to shear stress is

(A) 0.84   (B) 0.65

(C) 1.1   (D) 1.3

94. An earthfill requires 1500 cum of soil for construction work with a target density of $17 kN/m^3$. Bids were invited and three suppliers gave quotations as given in table below :

Supplier	Void ratio	Rate	Distance from site
A	0.4	Rs. 6 per cum	100 km
B	0.6	Rs. 5 per cum	110 km
C	0.8	Rs. 5 per cum	175 km

If transportation cost is Rs. 10/km, G = 2.7, Y_w = 10 kN/m^3, which of the following suppliers would be most economic ?

(A) A

(B) B

(C) C

(D) B and C both

95. A National Highway is passing through hilly terrain has a gradient of 5%, with radius of curve is 300 m. The gradient on the road should not be less than 4% as per IRC. The compensated gradient is

(A) 3.75%

(B) 4%

(C) 4.5%

(D) 4.75%

96. A vehicle is moving on a descending gradient with a velocity of 60 km/hr. Suddenly the driver observes an obstacle and applies brakes having 80% efficiency and stops at a distance of 260 m. If friction on road is 0.4, the descending gradient is

(A) 32%

(B) 26%

(C) 18%

(D) 13%

97. A 4% downward curve is followed by a 1% upward curve. Rate of change of grade adopted is 0.1% per 25 m length, the length of vertical curve is

(A) 500 m

(B) 1000 m

(C) 1250 m

(D) 1550 m

98. Lacings in a comand column under axial load of 1000 kN shall be designed for horizontal shear value of

(A)   250 kN

(B)   200 kN

(C)   100 kN

(D) 25 kN

99. At a site, 1000 cum of stone aggregates have to be transported from a distance of 50 km by a truck having 10 cum capacity for one trip. The rate of carriage including loading and unloading is given as below :

Upto first 5 km : Rs. 15 per cum per km, from 6th to 20th km : Rs.12 per cum per km, from 21st to 35th km : Rs. 10 per cum per km, from 36th to 50th km : Rs. 5 per cum per km.

The total transportation cost will be

(A)   Rs. 3,40,000

(B)   Rs. 4,20,000

(C)   Rs. 5,60,000

(D)   Rs. 6,10,000

100. For plastering work in a 5 m long wall of height 4 m, 1 : 6 cement mortar of thickness 12 mm, 1 : 4 cement mortar of thickness 20 mm or 1 : 5 cement mortar of thickness 15 mm can be used. If density of cement is 1440 kg/m$_3$ and rate of 1 bag of cement is Rs. 450, which the most economic mortar is ?

(A) 1 : 6 cement mortar of thickness 12 mm

(B) 1 : 4 cement mortar of thickness 20 mm

(C) 1 : 5 cement mortar of thickness 15 mm

(D) All of the above.