Raoshaan

ACHIEVEMENT TEST 2023-24

Class: 10 **MATHS**

[Max. Marks : 100
Time : 1.30 Hrs.

1. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in
(a) A. P (b) G. P (c) Both A. P and G. P (d) none of these

2. Graph of a linear polynomial is a
(a) straight line (b) circle (c) parabola (d) hyperbola

3. Transpose of a column matrix is
(a) unit matrix (b) diagonal matrix (c) column matrix (d) row matrix

4. For the given matrix $A = \begin{bmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{bmatrix}$ the order of the matrix A^T is
(a) 2 x 3 (b) 3 x 2 (c) 3 x 4 (d) 4 x 3

5. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is
(a) 0 (b) 1 (c) 0 or 1 (d) 2

6. If A is a 2 x 3 matrix and B is a 3 x 4 matrix, how many columns does A B have
(a) 3 (b) 4 (c) 2 (d) 5

7. If number of columns and rows are not equal in a matrix then it is said to be a
(a) diagonal matrix (b) rectangular matrix (c) square matrix (d) identity matrix

8. Find the matrix X if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$
(a) $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$

9. Which of the following can be calculated from the given matrices
$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, (i) A^2 (ii) B^2 (iii) AB (iv) BA
(a) (i) and (ii) only (b) (ii) and (iii) only (c) (ii) and (iv) only (d) all of these

10. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 1 \\ -2 & 5 \end{bmatrix}$ which of the following statements are correct?
(i) $AB + C = \begin{bmatrix} 5 & 5 \\ 5 & 5 \end{bmatrix}$ (ii) $BC = \begin{bmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{bmatrix}$ (iii) $BA + C = \begin{bmatrix} 2 & 5 \\ 3 & 0 \end{bmatrix}$ (iv) $(AB)C = \begin{bmatrix} -8 & 20 \\ -8 & 13 \end{bmatrix}$
(a) (i) and (ii) only (b) (ii) and (iii) only (c) (iii) and (iv) only (d) all of these

11. If α, β are the roots of $ax^2 + bx + c = 0$, $a \neq 0$, then the wrong statement is
(a) $\alpha^2 + \beta^2 = \frac{b^2 - 2ac}{a^2}$ (b) $\alpha\beta = \frac{c}{a}$ (c) $\alpha + \beta = \frac{b}{a}$ (d) $\frac{1}{\alpha} + \frac{1}{\beta} = -\frac{b}{c}$

12. If α and β are the roots of $ax^2 + bx + c = 0$, then one of the quadratic equations whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is, (a) $ax^2 + bx + c = 0$ (b) $bx^2 + ax + c = 0$ (c) $cx^2 + bx + a = 0$ (d) $cx^2 + ax + b = 0$

13. Let b = a + c. then the equation $ax^2 + bx + c = 0$ has equal roots, if
(a) a = c (b) a = -c (c) a = 2c (d) a = -2c

14. Matrix $A = [a_{ij}]_{mxn}$ is a square matrix if (a) m < n (b) m > n (c) m = 1 (d) m = n

15. If $A = (1 \ -2 \ 3)$ and $B = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$ then A + B
(a) (0 0 0) (b) $\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$ (c) (-14) (d) not defined

16. If a matrix is of order 2x3, then the number of elements in the matrix is (a) 5 (b) 6 (c) 2 (d) 3

17. If A is of order 3x4 and B is of order 4x3, then the order of BA is
(a) 3x3 (b) 4x4 (c) 4x3 (d) not defined

18. If A is of order mxn and B is of order pxq, addition of A and B is possible only if
(a) m = p (b) n = q (c) n = p (d) m = p, n = q

19. If $A = \begin{pmatrix} 7 & 2 \\ 1 & 3 \end{pmatrix}$ and $A + B = \begin{pmatrix} -1 & 0 \\ 2 & -4 \end{pmatrix}$ then the matrix B =
(a) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 6 & 2 \\ 3 & -1 \end{pmatrix}$ (c) $\begin{pmatrix} -8 & -2 \\ 1 & -7 \end{pmatrix}$ (d) $\begin{pmatrix} 8 & 2 \\ -1 & 7 \end{pmatrix}$

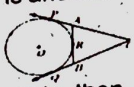
20. If $(5 \ x \ 1) \begin{pmatrix} -1 \\ 3 \end{pmatrix} = (20)$, then the value of x is
(a) 7 (b) -7 (c) $\frac{1}{7}$ (d) 0

21. In the adjacent figure $\angle BAC = 90^\circ$ and $AD \perp BC$ then
(a) $BD.CD = BC^2$ (b) $AB.AC = BC^2$
(c) $BD.CD = AD^2$ (d) $AB.AC = AD^2$

22. Two poles of heights 6m and 11 m stand vertically on a plane ground. If the distance between their feet is 12m, What is the distance between their tops? (a) 13 m (b) 14 m (c) 15 m (d) 12.8 m

23. In the given figure PR = 26 cm, QR = 24 cm, $\angle PAQ = 90^\circ$, PA = 6 cm and QA = 8cm. Find $\angle PQR$
(a) 80° (b) 85°
(c) 75° (d) 90°

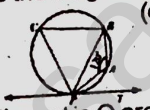
24. A tangent is perpendicular to the radius at the (a) centre (b) point of contact (c) infinity (d) chord
25. How many tangents can be drawn to the circle from an exterior point?
(a) one (b) two (c) infinite (d) zero
26. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70^\circ$ then the value $\angle AOB$ is (a) 100° (b) 110° (c) 120° (d) 130°
27. In figure CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If CP = 11 cm and BC = 7 cm, then the length of BR is
(a) 6 cm (b) 5 cm
(c) 8 cm (d) 4 cm



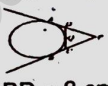
28. In figure PQ is tanget to the circle at P and O is the centre of the circle, then $\angle POQ$ is
(a) 120° (b) 100°
(c) 110° (d) 90°

29. AB and CD are two chords of a circle which when produced to meet at a point P such that AB = 5cm, AP = 8 cm, and CD = 2 cm then PD = (a) 12 cm (b) 5 cm (c) 6 cm (d) 4 cm
30. In the adjoining figure, chords AB and CD intersect at P. If AB = 16 cm, PD = 8cm, PC = 6 and AP > PB, then AP = (a) 8cm (b) 4 cm
(c) 12 cm (d) 6 cm

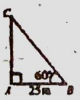
31. A point P is 26 cm away from the centre O of a circle and PT is the tangent drawn from P to the circle is 10 cm, then OT is equal to (a) 36 cm (b) 20 cm (c) 18 cm (d) 24 cm
32. In the figure, if $\angle PAB = 120^\circ$ then $\angle BPT =$
(a) 120° (b) 30°
(c) 40° (d) 60°



33. If the tangents PA and PB from an external point P to circle with centre O are inclined to each other at an angle of 40O then $\angle POA =$ (a) 70° (b) 80° (c) 50° (d) 60°
34. In the figure, PA and PB are tangents to the circle drawn from an external point P. Also CD is a tangent to the circle at Q. If PA = 8 cm andCQ = 3 cm, then PC is equal to
(a) 11 cm (b) 5 cm
(c) 24 cm (d) 38 cm



35. ΔABC is a right angled triangle where $\angle B = 90^\circ$ and $BD \perp AC$. If BD = 8 cm, AD = 4 cm, then CD is
(a) 24 cm (b) 16 cm (c) 32 cm (d) 8 cm
36. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure (a) 45° (b) 30° (c) 90° (d) 60°
37. The electric pole subtends an angle of 30° at a point on the same level as its foot, At a second point'b' metres above the first, the depression of the foot of the tower is 60°. The height of the tower (in metres) is equal to
(a) $\sqrt{3}\,b$ (b) $\frac{b}{3}$ (c) $\frac{b}{2}$ (d) $\frac{b}{\sqrt{3}}$
38. A tower is 60 m height. Its shadow is x metres shorter when the sun's altutide is 45° than when it has been 30°, then x is equal to (a) 41.92 m (b) 43.92 m (c) 43 m (d) 45.6 m
39. The angle of elevation of a cloud from a point h metres above a lake is β. The angle of depression of its reflection in the lake is 45°. The height of location of the cloud from the lake is
(a) $\frac{h(1+\tan\beta)}{1-\tan\beta}$ (b) $\frac{h(1-\tan\beta)}{1+\tan\beta}$ (c) $h\tan(45^\circ - \beta)$ (d) none of these
40. The angle of depression of the top and bottom of 20 m tall building from the top of a multistoried building are 30° and 60° respectively. The height of the multistoried building and the distance between two buildings (in metres) is (a) $20,10\sqrt{3}$ (b) $30,5\sqrt{3}$ (c) 20,10 (d) $30,10\sqrt{30}$
41. Two persons are standing 'x' metres apart from each from each other and the height of the first person is double that of the other. If from the middle point of the line joining their feet an observer finds the angular elevations of their tops to be complementary, then the height of the shorter person (in metres) is
a) $\sqrt{2}\,x$ (b) $\frac{x}{2\sqrt{2}}$ (c) $\frac{x}{\sqrt{2}}$ (d) $2x$
42. In the adjoining figure, AC =
(a) 25 m (b) $25\sqrt{3}$ m
(c) $\frac{25}{\sqrt{3}}$ m (d) $25\sqrt{2}$ m



43. In the adjoining figure $\angle ABC =$
(a) 45° (b) 30°
(c) 60° (d) 50°

44. A Man is 28.5 m away from a tower. His eye level above the ground is 1.5 m. The angle of elevation of the tower from his eyes is45°. Then the height of the tower is (a) 30m (b) 27.5 m (c) 28.5 m (d) 27 m

45. In the adjoining figure, $\sin\theta = \frac{15}{17}$. Then BC =

(a) 85 m (b) 65 m
(c) 95 m (d) 75 m

46. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is
(a) 60π cm² (b) $68\ \pi$ cm² (c) $120\ \pi$ cm² (d) $136\ \pi$ cm²

47. If two solid hemispheres of same base radius r units are joined together along their bases, then curved surface area of this new solid is (a) $4\ \pi r^2$ sq.units (b) $6\ \pi r^2$ sq.units (c) $3\ \pi r^2$ sq.units (d) $8\ \pi r^2$ sq.units

48. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
(a) 12 cm (b) 10 cm (c) 13 cm (d) 5 cm

49. If the radius of the base of a right circular cylinder is halved keeping the same height,then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is
(a) 1 : 2 (b) 1 : 4 (c) 1 : 6 (d) 1 : 8

50. The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is
(a) $\frac{9\pi h^2}{8}$ sq.units (b) $24\ \pi h^2$ sq.units (c) $\frac{8\pi h^2}{9}$ sq.units (d) $\frac{56\ \pi h^2}{9}$ sq.units

51. In a hollow cylinder, the sum of the external and internal radii is 14 cm and the width is 4 cm. If its height is 20cm, the volume of the material in it is
(a) $5600\ \pi$ cm³ (b) $11200\ \pi$ cm³ (c) $56\ \pi$ cm³ (d) $3600\ \pi$ cm³

52. If the radius of the base of a cone is tripled and the height is doubled then the volume is
(a) made 6 times (b) made 18 times (c) made 12 times (d) unchanged

53. The total surface area of a hemi - sphere is how much times the square of its radius,
(a) π (b) 4π (c) 3π (d) 2π

54. A solid sphere of radius x cm is melted and cast into a shape of a solid cone of same radius. The height of the cone is (a) 3x cm (b) x cm (c) 4x cm (d) 2x cm

55. A frustum of a right circular cone is of height 16 cm with radii of its ends as 8cm and 20cm. Then the volume of the frustum is (a) 3328π cm³ (b) $3228\ \pi$ cm³ (c)3240π cm³ (d) $3340\ \pi$ cm³

56. A shuttle cock used for playing badminton has the shape of the combination of (a) a cylinder and a sphere (b) a hemisphere and a cone (c) a sphere and a cone (d) frustum of a cone and hemisphere

57. A Spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
(a) 2 : 1 (b) 1 : 2 (c) 4 : 1 (d) 1 : 4

58. The volume (in cm³) of the greatest sphere that can be cut off from a cylindrical log of wood of base radius 1 cm and height 5 cm is (a) $\frac{4}{3}\ \pi$ (b) $\frac{10}{3}\ \pi$ (c) $5\ \pi$ (d) $\frac{20}{3}\ \pi$

59. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1 : 2$ then $r_2 : r_1$ is
(a) 1 : 3 (b) 1 : 2 (c) 2 : 1 (d) 3 : 1

60. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is
(a) 1 : 2 : 3 (b) 2 : 1 : 3 (c) 1 : 3 : 2 (d) 3 : 1 : 2

61. The curved surface area of a right circular cylinder of radius 1 cm and height 1 cm is equal to
(a) π cm² (b) 2π cm² (c) 3π cm³ (d) 2 cm²

62. Base area of a right circular cylinder is 80 cm². If its height is 5 cm, then the volume is equal to
(a) 400 cm³ (b) 16 cm³ (c) 200 cm³ (d) $\frac{400}{3}$ cm³

63. If the total surface area a solid right circular cylinder is $200\ \pi$ cm². and its radius is 5cm, then the sum of its sum of its height and radius is (a) 20 cm (b) 25 cm (c) 30 cm (d) 15 cm

64. The curved surface area of a right circular cylinder whose radius is a units and height is b units, is equal to
(a) $\pi a^2 b$ sq.cm (b) $2\pi ab$ sq.cm (c) 2π sq.cm (d) 2 sq.cm

65. If the diameter and height of a right circular cone are 12 cm and 8 cm respectively, then the slant height is
(a) 10 cm (b) 20 cm (c) 30 cm (d) 96 cm

66. The total surface area of a solid hemisphere of diameter 2 cm is equal to
(a) 12 cm² (b) $12\ \pi$ cm² (c) $4\ \pi$ cm² (d) $3\ \pi$ cm²

67. If the volume of a sphere is $\frac{9}{16}\ \pi$ cu.cm, then its radius is
(a) $\frac{4}{3}$ cm (b) $\frac{3}{4}$ cm (c) $\frac{3}{2}$ cm (d) $\frac{2}{3}$ cm

68. The surface areas of two spheres are in the ratio of 9 : 25. Then their volumes are in the ratio
(a) 81 : 625 (b) 729 : 15625 (c) 27 : 75 (d) 27 : 125

69. The total surface area of a solid hemisphere whose radius is a units, is equal to
(a) $2\ \pi\ a^2$ sq.units (b) $3\ \pi\ a^2$ sq.units (c) $3\ \pi$ a sq.units (d) $3\ a^2$ sq.units

70. If the radius of a sphere is half of the radius of another sphere, then their respective volumes are in the ratio
(a) 1 : 8 (b) 2 : 1 (c) 1 : 2 (d) 8 : 1

71. Which of the following is not a measure of dispersion?
(a) Range (b) Standard deviation (c) Arithmetic mean (d) Variance

72. The range of the data 8,8,8,8,8 .....8 is (a) 0 (b) 1 (c) 8 (d) 3

73. The sum of all deviations of the data from its mean is
(a) Always positive (b) always negative (c) zero (d) non - zero integer

74. The mean of 100 observations is 40 and their standard deviation is 3. The sum of squares of all deviations is
(a) 40000 (b) 160900 (c) 160000 (d) 30000

75. Variance of first 20 natural numbers is (a) 32.25 (b) 44.25 (c) 33.25 (d) 30

76. The standard deviation of a data is 3. If each value is multiplied by 5 then the new vairance is
(a) 3 (b) 15 (c) 5 (d) 225

77. If the standard deviation of x, y, z is p then the standard deviation of 3x + 5, 3y + 5, 3z + 5 is
(a) 3 p + 5 (b) 3 p (c) p + 5 (d) 9 p + 15

78. If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is
(a) 3,5 (b) 3 (c) 4.5 (d) 2.5

79. The probability a red marble selected at random from a jar containing p red, q blue and r green marbles is
(a) $\frac{q}{P+q+r}$ (b) $\frac{p}{p+q+r}$ (c) $\frac{p+q}{p+q+r}$ (d) $\frac{p+r}{p+q+r}$

80. Which of the following is incorrect? (a) $P(A) > 1$ (b) $0 \le P(A) \le 1$ (c) $P(\phi) = 0$ (d) $p(A) + P(\bar{A}) = 1$

81. A page is selected at random from a book. The Probability that the digit at units place of the page number chosen is less than 7 is (a) $\frac{3}{10}$ (b) $\frac{7}{10}$ (c) $\frac{3}{9}$ (d) $\frac{7}{9}$

82. The probability of getting a job for a person is $\frac{x}{3}$. If the probablity of not getting the job is $\frac{2}{3}$ then the value of x is (a) 2 (b) 1 (c) 3 (d) 1.5

83. Kamalam went to play a lucky draw contest. 135 ticets of the lucky draw were sold. If the probability of Kamalam winning is $\frac{1}{9}$, then the number of tickets bought by Kamalam is
(a) 5 (b) 10 (c) 15 (d) 20

84. If a letter is chosen at random from the English alphabets {a,b,.....z} then the probability that the letter chosen precedes x (a) $\frac{12}{13}$ (b) $\frac{1}{13}$ (c) $\frac{23}{26}$ (d) $\frac{3}{26}$

85. A purse contains 10 notes of ₹.2000,15 notes of ₹.500, and 25 notes of ₹.200. One note is drawn at random. What is the probability that the note is either a ₹.500 note or ₹.200 note?
(a) $\frac{1}{5}$ (b) $\frac{3}{10}$ (c) $\frac{2}{3}$ (d) $\frac{4}{5}$

86. The range of the first 10 Prime number 2,3,5,7,11,13,17,19,23,29 is (a) 28 (b) 26 (c) 29 (d) 27

87. For a collection of 11 items, $\Sigma x = 132$, then the arithmetic mean is (a) 11 (b) 12 (c) 14 (d) 13

88. For any collection of n items, $\Sigma x\ (x - \bar{x}) =$ (a) Σx (b) $\bar{x}$ (c) $n\bar{x}$ (d) 0

89. For any collection of n items, $(\Sigma x) - \bar{x} =$ (a) $n\bar{x}$ (b) $(n-2)\bar{x}$ (c) $(n-1)\bar{x}$ (d) 0

90. If t is the standard deviation of x,y,z then the standard deviation x+5, y+5,z+5 is
(a) $\frac{t}{3}$ (b) t + 5 (c) t (d) x y z

91. Variance of the first 11 natural numbers is (a) $\sqrt{5}$ (b) $\sqrt{10}$ (c) $5\sqrt{2}$ (d) 10

92. Standard deviation of a collection of data is $2\sqrt{2}$. If each value of multiplied by 3, then the standard deviation of the new data is (a) $\sqrt{12}$ (b) $4\sqrt{2}$ (c) $6\sqrt{2}$ (d) $9\sqrt{2}$

93. If ϕ is an imposible event, the $p(\phi) =$ (a) 1 (b) $\frac{1}{4}$ (c) 0 (d) $\frac{1}{2}$

94. If p is the probability of an event A, then p satisfies
(a) $0 < p < 1$ (b) $0 \le p \le 1$ (c) $0 \le p < 1$ (d) $0 < p \le 1$

95. There are 6 defective items in a sample of 20 items. One item is drawn at random. The probability that it is a non - defective item is (a) $\frac{7}{10}$ (b) 0 (c) $\frac{3}{10}$ (d) $\frac{2}{3}$

96. Two dice are thrown simultaneously. the probability of getting a doublet is
(a) $\frac{1}{36}$ (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) $\frac{2}{3}$

97. Probability of getting 3 heads or tails in tossing a coin 3 times is
(a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{3}{8}$ (d) $\frac{1}{2}$

98. The probability that a leap year will have 53 Fridays or 53 Saturday is
(a) $\frac{2}{7}$ (b) $\frac{1}{7}$ (c) $\frac{4}{7}$ (d) $\frac{3}{7}$

99. The probability of selecting a queen of hearts when a card is drawn from a pack of 52 playing card is
(a) $\frac{1}{52}$ (b) $\frac{16}{52}$ (c) $\frac{1}{13}$ (d) $\frac{1}{26}$

100. Probability of sure event is
(a) 1 (b) 0 (c) 100 (d) 0.1