10th MATHS ONE MARK QUESTIONS - BOOK BACK SHUFFLED EM (2024-2025)

ORDER OF QUESTIONS INTERCHANGED

CHAPTER – 1 (RELATIONS AND FUNCTIONS)

1. Let $f(x) = \sqrt{1+x^2}$ then
   (a) None of these (b) $f(xy) \leq f(x).f(y)$
   (c) $f(xy) \geq f(x).f(y)$ (d) $f(xy) = f(x).f(y)$
2. Let f and g be two functions given by $f = \{(0,1), (2,0), (3,-4), (4,2), (5,7)\}$ $g = \{(0,2), (1,0), (2,4), (-4,2), (7,0)\}$ then the range of $f \circ g$ is
   (a) $\{1,2,3,4,5\}$ (b) $\{0,1,2\}$
   (c) $\{0,2,3,4,5\}$ (d) $\{-4,1,0,2,7\}$
3. If $f : A \to B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to.
   (a) 1 (b) 14 (c) 7 (d) 49
4. If there are 1024 relations from a set $A = \{1,2,3,4,5\}$ to a set B, then the number of elements in B is
   (a) 4 (b) 8 (c) 3 (d) 2
5. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then $f \circ g$ is
   (a) $\frac{2}{3x^2}$ (b) $\frac{3}{2x^2}$ (c) $\frac{1}{6x^2}$ (d) $\frac{2}{9x^2}$
6. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
   (a) Quadratic (b) Reciprocal
   (c) Cubic (d) Linear
7. If $n(A \times B) = 6$ and $A = \{1,3\}$, then $n(B)$ is
   (a) 2 (b) 1 (c) 6 (d) 3
8. If $g = \{(1,1), (2,3), (3,5), (4,7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the value of α and β are
   (a) $(1,2)$ (b) $(-1,-2)$
   (c) $(2,-1)$ (d) $(-1,2)$
9. If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a,b) is
   (a) $(2,3)$ (b) $(3,-2)$ (c) $(2,-2)$ (d) $(5,1)$
10. Let $n(A) = m$ and $n(B) = n$ then the total number of non - empty relations that can be defined from A to B is
    (a) 2^{mn} (b) $2^{mn} - 1$ (c) n^m (d) m^n
11. Let $A = \{1,2,3,4\}$ and $B = \{4,8,9,10\}$. A function $f: A \to B$ given by $f = \{(1,4), (2,8), (3,9), (4,10)\}$ is a
    (a) Into Function (b) One – to – One Function
    (c) Identity Function (d) Many – One Function
12. If $A = \{1,2\}$, $B = \{1,2,3,4\}$, $C = \{5,6\}$ and $D = \{5,6,7,8\}$ then state which of the following statement is true.
    (a) $(A \times B) \subset (A \times D)$ (b) $(D \times A) \subset (B \times A)$
    (c) $(A \times C) \subset (B \times D)$ (d) $(B \times D) \subset (A \times C)$
13. If $\{(a,8), (6,b)\}$ represents an identity function, then the value of a and b are respectively
    (a) (6,8) (b) (6,6) (c) (8,6) (d) (8,8)
14. $A = \{a, b, p\}$, $B = \{2,3\}$, $C = \{p,q,r,s\}$ then $n[(A \cup C) \times B]$ is
    (a) 20 (b) 8 (c) 16 (d) 12
15. The range of the relation $\mathbb{R} = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$ is
    (a) $\{1,4,9,25,49,121\}$ (b) $\{4,9,25,49,121\}$
    (c) $\{2,3,5,7,11\}$ (d) $\{2,3,5,7\}$

CHAPTER – 2 (NUMBERS AND SEQUENCES)

1. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
   (a) 2 (b) 4 (c) 3 (d) 1
2. The least number that is divisible by all the numbers from 1 to 10 (both exclusive) is
   (a) 5025 (b) 2520 (c) 2025 (d) 5220
3. The value of $(1^3 + 2^3 + 3^3 + \cdots + 15^3) - (1 + 2 + 3 + \cdots + 15)$ is
   (a) 14520 (b) 14280
   (c) 14200 (d) 14400
4. The sum of the exponents of the prime factors in the prime factorization of 1729 is

(a) 4 (b) 3 (c) 2 (d) 1

5. If the sequence $t_1, t_2, t_3, \ldots$ are in A.P then the sequence $t_6, t_{12}, t_{18}, \ldots$ is
   (a) A constant sequence
   (b) Neither an Arithmetic Progression nor a Geometric Progression
   (c) An Arithmetic Progression
   (d) A Geometric Progression
6. $7^{4k} \equiv$ _____$(mod\ 100)$
   (a) 4 (b) 3 (c) 2 (d) 1
7. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \cdots + 2^0$ which of the following is true?.
   (a) A is larger than B by 1
   (b) B is larger than A by 1
   (c) A and B are Equal
   (d) B is 2^{64} more than A
8. Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
   (a) 5 (b) 3 (c) 11 (d) 8
9. If 6 times of 6^{th} term of an A.P is equal to 7 times the 7^{th} term , then the 13^{th} term of the A.P is
   (a) 7 (b) 13 (c) 0 (d) 6
10. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are.
    (a) 1, 4, 8 (b) 0, 1, 8
    (c) 1, 3, 5 (d) 0, 1, 3
11. In an A.P the first term is 1 and the common difference is 4. How many terms of the A.P must be taken for their sum to be equal to 120?.
    (a) 8 (b) 9 (c) 6 (d) 7
12. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is
    (a) $\frac{2}{3}$ (b) $\frac{1}{81}$ (c) $\frac{1}{24}$ (d) $\frac{1}{27}$
13. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A. P.
    (a) 7881 (b) 13531 (c) 4551 (d) 10091
14. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy.
    (a) $0 \le r < b$ (b) $0 < r \le b$
    (c) $1 < r < b$ (d) $0 < r < b$
15. An A.P consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P is
    (a) $\frac{31}{2}\ m$ (b) $31\ m$ (c) $62\ m$ (d) $16\ m$

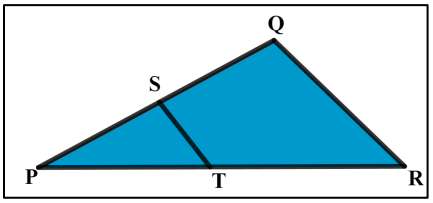
CHAPTER – 3 (ALGEBRA)

1. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to
   (a) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$ (b) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$
   (c) $16\left|\frac{y^2}{x^2z^4}\right|$ (d) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$
2. Transpose of a column matrix is
   (a) Column matrix (b) Row matrix
   (c) Unit matrix (d) Diagonal matrix
3. Which of the following should be added to make $x^4 + 64$ a perfect square
   (a) $8x^2$ (b) $-8x^2$ (c) $4x^2$ (d) $16x^2$
4. If A is a 2×3 matrix and B is a 3×4 matrix how many columns does AB have
   (a) 4 (b) 3 (c) 5 (d) 2
5. Which of the following can be calculated from the given matrices $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}, B = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$
   (i) A^2 (ii) B^2 (iii) AB (iv) BA
   (a) All of these (b) (ii) and (iv) only
   (c) (ii)and (iii)only (d) (i) and (ii) only
6. $\frac{x}{x^2-25} - \frac{x}{x^2+6x+5}$ gives
   (a) $\frac{x^2-7x+40}{(x^2-25)(x+1)}$ (b) $\frac{x^2+10}{(x^2-25)(x+1)}$
   (c) $\frac{x^2-7x+40}{(x-5)(x+5)}$ (d) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$
7. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is
   (a) 0 or 1 (b) 2 (c) 0 (d) 1

8. 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) Both A.P and G.P (b) None of these
   (c) A.P (d) G.P
9. Graph of a linear equation is a _____.
   (a) Parabola (b) Hyperbola
   (c) Straight line (d) Circle
10. The value of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are
    (a) $12, 10$ (b) $-120, 100$
    (c) $10, 12$ (d) $100, 120$
11. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{pmatrix}$ and $C = \begin{pmatrix} 0 & 1 \\ -2 & 5 \end{pmatrix}$ which of the following statements are correct?. (i) $AB + C = \begin{pmatrix} 5 & 5 \\ 5 & 5 \end{pmatrix}$
    (ii) $BC = \begin{pmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{pmatrix}$ (iii) $BA + C = \begin{pmatrix} 2 & 5 \\ 3 & 0 \end{pmatrix}$
    (iv) $(AB)C = \begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$
    (a) All of these (b) (iii) and (iv) only
    (c) (ii) and (iii) only (d) (i) and (ii) only
12. The solution of $(2x - 1)^2 = 9$ is equal to
    (a) $-1, 2$ (b) None of these
    (c) -1 (d) 2
13. If number of columns and rows are not equal in a matrix then it is said to be a
    (a) Identity matrix (b) Square matrix
    (c) Rectangular matrix (d) Diagonal matrix
14. $y^2 + \frac{1}{y^2}$ is not equal to
    (a) $\left(y + \frac{1}{y}\right)^2 - 2$ (b) $\left(y + \frac{1}{y}\right)^2$
    (c) $\left(y - \frac{1}{y}\right)^2 + 2$ (d) $\frac{y^4+1}{y^2}$
15. The solution of the system $x + y - 3z = -6$, $-7y + 7z = 7, 3z = 9$ is
    (a) $x = -1, y = 2, z = 3$
    (b) $x = 1, y = 2, z = 3$
    (c) $x = 1, y = -2, z = 3$
    (d) $x = -1, y = -2, z = 3$
16. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is
    (a) $\frac{7(y^2-2y+1)}{y^2}$ (b) $\frac{21y^2-42y+21}{3y^3}$
    (c) $\frac{9y^3}{(21y-21)}$ (d) $\frac{9y}{7}$
17. If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
    (a) 6 (b) 8 (c) 3 (d) 5
18. Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
    (a) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$
    (c) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ (d) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$
19. A system of three linear equations in three variables is inconsistent if their planes.
    (a) Intersect only at a point
    (b) do not intersect
    (c) Coincides with each other
    (d) Intersect in a line
20. For the given matrix $A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is
    (a) 3×4 (b) 4×3 (c) 2×3 (d) 3×2

CHAPTER – 4 (GEOMETRY)

1. In a given figure $ST \parallel QR, PS = 2\ cm$ and $SQ = 3\ cm$. Then the ratio of the area of ΔPQR to the area of ΔPST is
   (a) $25 : 13$
   (b) $25 : 7$
   (c) $25 : 11$
   (d) $25 : 4$

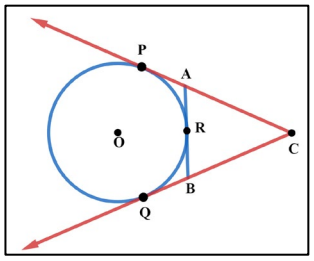


2. A tangent is perpendicular to the radius at the
   (a) Chord (b) Infinity
   (c) Point of contact (d) Centre

3. The perimeters of two similar triangles ΔABC and ΔPQR are 36 cm and 24 cm respectively. If $PQ = 10\ cm$, then the length of AB is

$(a)\ 6\frac{2}{3}\ cm\ \ (b) 15\ cm\ \ (c)\ 6\frac{2}{3}\ cm\ \ (d)\ \frac{10\sqrt{6}}{3}\ cm$

4. 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

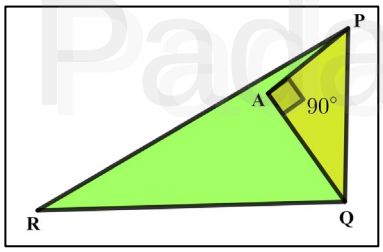


$(a)\ 4\ cm$
$(b)\ 8\ cm$
$(c)\ 5\ cm$
$(d)\ 6\ cm$

5. In a ΔABC, AD is the bisector of $\angle BAC$. If $AB = 8\ cm, BD = 6\ cm$ and $DC = 3\ cm$. The length of the side AC is

$(a)\ 8\ cm\ \ (b)\ 3\ cm\ \ (c)\ 4\ cm\ \ (d)\ 6\ cm$

6. In the given figure, $PR = 26\ cm,\ QR = 24\ cm,$ $\angle PAQ = 90^\circ,\ PA = 6\ cm$ and $QA = 8\ cm$. Find $\angle PQR$



$(a)\ 85^\circ$
$(b)\ 90^\circ$
$(c)\ 75^\circ$
$(d)\ 80^\circ$

7. 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 of $\angle AOB$ is

$(a)\ 120^\circ\ \ (b)\ 110^\circ\ \ (c)\ 100^\circ\ \ (d)\ 130^\circ$

8. If ΔABC is an isosceles triangle with $\angle C = 90^\circ$ and $AC = 5\ cm$ then AB is

$(a)\ 10\ cm\ \ (b)\ 5\sqrt{2}\ cm\ \ (c)\ 2.5\ cm\ \ (d)\ 5\ cm$

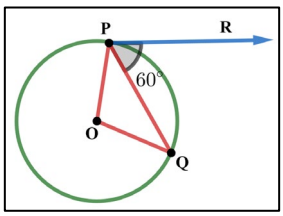
9. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m , what is the distance between their tops?.

$(a)\ 14\ m\ \ (b)\ 13\ m\ \ (c)\ 12.8\ m\ \ (d)\ 15\ m$

10. How many tangents can be drawn to the circle from an exterior point?.

(a) Two (b) One
(c) Infinite (d) Zero

11. In figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle POQ$ is

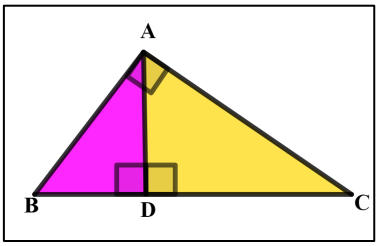


$(a)\ 110^\circ$
$(b)\ 90^\circ$
$(c)\ 120^\circ$
$(d)\ 100^\circ$

12. If in $\Delta ABC, DE \parallel BC. AB = 3.6\ cm,\ AC = 2.4\ cm$ and $AD = 2.1\ cm$ then the length of AE is

$(a)\ 1.05\ cm\ \ (b)\ 1.2\ cm\ \ (c)\ 1.8\ cm\ \ (d)\ 1.4\ cm$

13. In the adjacent figure $\angle BAC = 90^\circ$ and $AD \perp BC$ then



$(a)\ BD.CD = AD^2$
$(b)\ AB.AC = AD^2$
$(c)\ BD.CD = BC^2$
$(d)\ AB.AC = BC^2$

14. In $\Delta LMN, \angle L = 60^\circ, \angle M = 50^\circ$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is.

$(a)\ 30^\circ\ \ (b)\ 110^\circ\ \ (c)\ 40^\circ\ \ (d)\ 70^\circ$

15. If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when

$(a)\ \angle A = \angle F\ \ (b)\ \angle B = \angle D$
$(c)\ \angle A = \angle D\ \ (d)\ \angle B = \angle E$

CHAPTER – 5 (COORDINATE GEOMETRY)

1. If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is

$(a)\ 0\ \ (b)\ \frac{1}{\sqrt{3}}\ \ (c)\ -\sqrt{3}\ \ (d)\ \sqrt{3}$

2. The point of intersection of $3x - y = 4$ and $x + y = 8$ is

$(a)\ (3,5)\ \ (b)\ (4,4)\ \ (c)\ (5,3)\ \ (d)\ (2,4)$

3. If A is a point on the Y axis whose ordinate is 8 and B is a point on the X axis whose abscissae is 5 then the equation of the line AB is

$(a)\ 8x - 5y = 400\ \ (b)\ 8x + 5y = 4$
$(c)\ y = 5\ \ (d)\ x = 8$

4. $(2,1)$ is the point of intersection of two lines
   $(a)\ x+3y-3=0; x-y-7=0$
   $(b)\ 3x+y=3;\ x+y=7$
   $(c)\ x+y=3;\ 3x+y=7$
   $(d)\ x-y-3=0\ ; 3x-y-7=0$
5. If $(5,7),(3,p)$ and $(6,6)$ are collinear, then the value of p is
   $(a)\ 6$ $(b)\ 3$ $(c)\ 12$ $(d)\ 9$
6. A straight line has equation $8y=4x+21$. Which of the following is true
   (a) The slope is 0.5 and the y intercept is 1.6
   (b) The slope is 5 and the y intercept is 2.6
   (c) The slope is 0.5 and the y intercept is 2.6
   (d) The slope is 5 and the y intercept is 1.6
7. The slope of the line joining $(12,3),(4,a)$ is $\frac{1}{8}$. The value of 'a' is
   $(a)\ 2$ $(b)\ -5$ $(c)\ 4$ $(d)\ 1$
8. The equation of a line passing through the origin and perpendicular to the line $7x-3y+4=0$ is
   $(a)\ 3x+7y=0$ $(b)\ 7x-3y=0$
   $(c)\ 7x-3y+4=0$ $(d)\ 3x-7y+4=0$
9. A man walks near a wall, such that the distance between him and the wall is 10 units. Consider the wall to be the Y axis. The path travelled by the man is
   $(a)\ y=0$ $(b)\ x=0$
   $(c)\ y=10$ $(d)\ x=10$
10. When proving that a quadrilateral is a parallelogram by using slopes you must find
    (a) The lengths of all sides
    (b) Both the lengths and slopes of two sides
    (c) The slopes of two sides
    (d) The slopes of two pair of opposite sides
11. The slope of the line which is perpendicular to a line joining the points $(0,0)$ and $(-8,8)$ is
    $(a)\ -8$ $(b)\ \frac{1}{3}$ $(c)\ 1$ $(d)\ -1$
12. The straight line given by the equation $x=11$ is
    (a) Parallel to Y axis (b) Parallel to X axis
    (c) Passing through the point $(0,11)$
    (d) Passing through the origin
13. When proving that a quadrilateral is a trapezium, it is necessary to show
    (a) Opposite sides are parallel
    (b) All sides are of equal length
    (c) Two sides are parallel
    (d) Two parallel and two non – parallel sides
14. The area of triangle formed by the points $(-5,0),(0,-5)$ and $(5,0)$ is.
    (a) None of these $(b)\ 5\ sq.units$
    $(c)\ 25\ sq.units$ $(d)\ 0\ sq.units$
15. Consider four straight lines $(i)\ l_1; 3y=4x+5$
    $(ii)\ l_2; 4y=3x-1$ $(iii)\ l_3; 4y+3x=7$
    $(iv)\ l_4; 4x+3y=2$
    Which of the following statement is true?.
    $(a)\ l_2$ and l_4 are perpendicular
    $(b)\ l_2$ and l_3 are parallel
    $(c)\ l_1$ and l_2 are perpendicular
    $(d)\ l_1$ and l_4 are parallel

CHAPTER – 6 (TRIGONOMETRY)

1. $(1+\tan\theta+\sec\theta)(1+\cot\theta-cosec\,\theta)$ is equal to
   $(a)\ 2$ $(b)\ -1$ $(c)\ 0$ $(d)\ 1$
2. Two persons are standing 'x' metres apart 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
   $(a)\ 2x$ $(b)\ \frac{x}{\sqrt{2}}$ $(c)\ \frac{x}{2\sqrt{2}}$ $(d)\ \sqrt{2}\,x$
3. If $\sin\theta=\cos\theta$, then $2tan^2\theta+sin^2\theta-1$ is equal to
   $(a)\ \frac{3}{2}$ $(b)\ \frac{-3}{2}$ $(c)\ \frac{-2}{3}$ $(d)\ \frac{2}{3}$

4. A tower is 60 m heigh. Its shadow reduces by x metres when the angle of elevation of the sun increases from 30° to 45° then x is equal to

$(a)\ 43\ m \quad (b)\ 45.6\ m \quad (c)\ 41.92\ m \quad (d)\ 43.92\ m$

5. If $5x = \sec\theta$ and $\frac{5}{y} = \tan\theta$, then $x^2 - \frac{1}{y^2}$ is equal to

$(a)\ \frac{1}{25} \quad (b)\ 25 \quad (c)\ 1 \quad (d)\ 5$

6. 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

$(a)\ 60^\circ \quad (b)\ 90^\circ \quad (c)\ 30^\circ \quad (d)\ 45^\circ$

7. 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

$(a)\ h\tan(45^\circ - \beta)$ (b) None of these

$(c)\ \frac{h(1+\tan\beta)}{1-\tan\beta}$ $(d)\ \frac{h(1-\tan\beta)}{1+\tan\beta}$

8. $a\cot\theta + b\ cosec\ \theta = p$ and $b\cot\theta + a\ cosec\ \theta = q$ then $p^2 - q^2$ is equal to

$(a)\ a^2 + b^2 \quad (b)\ b - a \quad (c)\ a^2 - b^2 \quad (d)\ b^2 - a^2$

9. If $\sin\theta + \cos\theta = a$ and $\sec\theta + \text{cosec}\,\theta = b$, then the value of $b(a^2 - 1)$ is equal to

$(a)\ 0 \quad (b)\ a \quad (c)\ 2a \quad (d)\ 3a$

10. 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 pole is 60°. The height of the pole (in metres) is equal to

$(a)\ \frac{b}{2} \quad (b)\ \frac{b}{\sqrt{3}} \quad (c)\ \sqrt{3}\,b \quad (d)\ \frac{b}{3}$

11. The value of $sin\ ^2\theta + \frac{1}{1+tan\ ^2\theta}$ is equal to

$(a)\ 1 \quad (b)\ tan^2\theta \quad (c)\ 0 \quad (d)\ cot^2\theta$

12. If $x = a\tan\theta$ and $y = b\sec\theta$ then

$(a)\ \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ $(b)\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$

$(c)\ \frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ $(d)\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

13. If $(\sin\alpha + cosec\ \alpha)^2 + (\cos\alpha + sec\ \alpha)^2 = k + tan^2\alpha + cot^2\alpha$, then the value of k is equal to

$(a)\ 5 \quad (b)\ 3 \quad (c)\ 9 \quad (d)\ 7$

14. 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 building (in metres) is

$(a)\ 20,10\ (b)\ 30,10\sqrt{3}\ (c)\ 20, 10\sqrt{3}\ (d)\ 30, 5\sqrt{3}$

15. $\tan\theta cosec^2\theta - \tan\theta$ is equal to

$(a)\ \sin\theta \quad (b)\ \cot\theta \quad (c)\ \sec\theta \quad (d)\ cot^2\theta$

CHAPTER – 7 (MENSURATION)

1. 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 20 cm, the volume of the material in it is

$(a)\ 3600\pi\ cm^3$ $(b)\ 56\pi\ cm^3$

$(c)\ 1120\pi\ cm^3$ $(d)\ 5600\pi\ cm^3$

2. 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

$(a)\ 1:2 \quad (b)\ 2:1 \quad (c)\ 1:4 \quad (d)\ 4:1$

3. If the radius of the base of a cone is tripled and the height is doubled then the volume is

(a) Made 12 times (b) Unchanged

(c) Made 6 times (d) Made 18 times

4. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is

$(a)\ 3:1:2$ $(b)\ 1:3:2$

$(c)\ 2:1:3$ $(d)\ 1:2:3$

5. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be

$(a)\ 13\ cm \quad (b)\ 5\ cm \quad (c)\ 12\ cm \quad (d)\ 10\ cm$

6. The volume (in cm^3) 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

$(a)\ 5\pi$ $(b)\ \frac{20}{3}\pi$ $(c)\ \frac{4}{3}\pi$ $(d)\ \frac{10}{3}\pi$

7. The height and radius of the cone of which the frustrum is a part are h_1 units and r_1 units respectively. Height of the frustrum 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

$(a)\ 3:1$ $(b)\ 2:1$ $(c)\ 1:2$ $(d)\ 1:3$

8. 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

$(a)\ 1:6$ $(b)\ 1:8$ $(c)\ 1:2$ $(d)\ 1:4$

9. The total surface area of a hemi – sphere is how much times the square of its radius.

$(a)\ 2\pi$ $(b)\ 3\pi$ $(c)\ 4\pi$ $(d)\ \pi$

10. 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

$(a)\ 6\pi r^2$ sq. units $(b)\ 4\pi r^2$ sq. units

$(c)\ 8\pi r^2$ sq. units $(d)\ 3\pi r^2$ sq. units

11. 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

$(a)\ 2x\ cm$ $(b)\ 4x\ cm$ $(c)\ x\ cm$ $(d)\ 3x\ cm$

12. A shuttle cock used for playing badminton has the shape of the combination of

(a) A sphere and a cone

(b) Frustrum of a cone and a hemisphere

(c) A cylinder and a sphere

(d) A hemisphere and a cone

13. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is

$(a)\ 68\pi\ cm^2$ $(b)\ 60\pi\ cm^2$

$(c)\ 136\pi\ cm^2$ $(d)\ 120\pi\ cm^2$

14. The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is

$(a)\ \frac{56\pi h^2}{9}$ sq. units $(b)\ \frac{8\pi h^2}{9}$ sq. units

$(c)\ 24\pi h^2$ sq. units $(d)\ \frac{9\pi h^2}{8}$ sq. units

15. A frustrum of a right circular cone is of height 16 cm with radii of its as 8 cm and 20 cm. Then, the volume of the frustrum is

$(a)\ 3228\pi\ cm^3$ $(b)\ 3328\pi\ cm^3$

$(c)\ 3340\pi\ cm^3$ $(d)\ 3240\pi\ cm^3$

CHAPTER – 8 (STATISTICS AND PROBABILITY)

1. If the mean and coefficient of variation of a data are 4 and 87.5 % then the standard deviation is

$(a)\ 4.5$ $(b)\ 2.5$ $(c)\ 3.5$ $(d)\ 3$

2. The mean of 100 observations is 40 and their standard deviation is 3. The sum of squares of all observations is

$(a)\ 160000$ $(b)\ 30000$ $(c)\ 40000$ $(d)\ 160900$

3. The probability a red marble selected at random from a jar containing p red, q blue and r green marbles is

$(a)\ \frac{p}{p+q+r}$ $(b)\ \frac{q}{p+q+r}$ $(c)\ \frac{p+r}{p+q+r}$ $(d)\ \frac{p+q}{p+q+r}$

4. Variance of first 20 natural numbers is

$(a)\ 32.25$ $(b)\ 33.25$ $(c)\ 30$ $(d)\ 44.25$

5. 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

$(a)\ \frac{3}{9}$ $(b)\ \frac{7}{9}$ $(c)\ \frac{3}{10}$ $(d)\ \frac{7}{10}$

6. The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is

$(a)\ 5$ $(b)\ 225$ $(c)\ 3$ $(d)\ 15$

7. The sum of all deviations of the data from its mean is

(a) Non – Zero integer (b) Zero

(c) Always negative (d) Always positive

8. Kamalan went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalan winning is $\frac{1}{9}$, then the number of tickets bought by Kamalan is

   (a) 15 (b) 20 (c) 5 (d) 10

9. The range of the data $8, 8, 8, 8, 8 \ldots 8$ is

   (a) 8 (b) 3 (c) 0 (d) 1

10. 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) $\frac{3}{10}$ (b) $\frac{1}{5}$ (c) $\frac{4}{5}$ (d) $\frac{2}{3}$

11. Which of the following is incorrect?.

    (a) $P(A) + P(\bar{A}) = 1$ (b) $P(\phi) = 0$

    (c) $0 \leq P(A) \leq 1$ (d) $P(A) > 1$

12. If a letter is chosen at random from the English alphabets $\{a, b, \ldots z\}$, then the probability that the letter chosen precedes x

    (a) $\frac{23}{26}$ (b) $\frac{3}{26}$ (c) $\frac{12}{13}$ (d) $\frac{1}{13}$

13. If the standard deviation of x, y, z is p then the standard deviation of $3x + 5, 3y + 5, 3z + 5$ is

    (a) $p + 5$ (b) $9p + 15$ (c) $3p + 5$ (d) $3p$

14. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then the value of x is

    (a) 3 (b) 1.5 (c) 2 (d) 1

15. Which of the following is not a measure of dispersion?.

    (a) Arithmetic Mean (b) Variance

    (c) Range (d) Standard deviation

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PG – TEACHER (MATHS)

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