10th MATHS: ONE MARK – Study Material

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Unit-1: RELATIONS & FUNCTIONS

Sl.No.	QUESTION	ANSWER
1	If $n(A \times B) = 6$ and $A = \{1, 3\}$ then $n(B)$ is	**3**
2	$A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is	**12**
3	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.	$(A \times C) \subset (B \times D)$
4	If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements	**2**
5	The range of the relation $R = \{(x, x^2) \mid x$ is a prime number less than 13$\}$ is	$\{4, 9, 25, 49, 121\}$
6	If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal then (a, b) is	$(3, -2)$
7	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	$2^{mn} - 1$
8	If $\{(a, 8), (6, b)\}$ represents an identify function, then the value of a and b are respectively	$(8, 6)$
9	Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f : A \rightarrow B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a	**One-to-one function**
10	If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then $f \circ g$ is	$\frac{2}{9x^2}$
11	If $f : A \rightarrow B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to	**7**
12	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	$\{0, 1, 2\}$
13	Let $f(x) = \sqrt{1 + x^2}$ then	$f(xy) \leq f(x).f(y)$
14	If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of	$(2, -1)$
15	$f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is	**quadratic**

Unit-2: NUMBERS & SEQUENCES

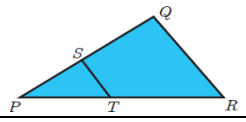
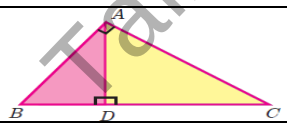
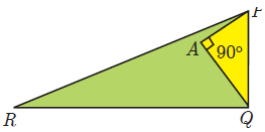
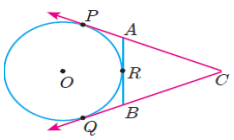
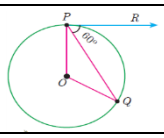
Sl.No.	QUESTION	ANSWER
16	Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy	$\mathbf{0 \leq r < b}$
17	Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are	**0, 1, 8**
18	If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is	**2**
19	The sum of the exponents of the prime factors in the prime factorization of 1729 is	**3**
20	The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is	**2520**
21	$7^{4k} \equiv$ _____ (mod 100)	**1**
22	Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is	**11**
23	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	**7881**
24	If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is	**0**
25	An A.P. consists of 31 terms. If its 16th term is m, then the sum of all the terms of this A.P. is	**31 m**
26	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?	**8**
27	If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ldots + 2^0$ which of the following is true?	**A is larger than B by 1**
28	The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is	$\mathbf{\frac{1}{27}}$
29	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	**an Arithmetic Progression**
30	The value of $(1^3 + 2^3 + 3^3 + \cdots + 15^3) - (1 + 2 + 3 + \ldots + 15)$ is	**14280**

Unit-3: ALGEBRA

Sl.No.	QUESTION	ANSWER
31	A system of three linear equations in three variables is inconsistent if their planes	**do not intersect**
32	The solution of the system $x+y-3x=-6,\ -7y+7z=7,\ 3z=9$ is	$\boldsymbol{x=1,\ y=2,\ z=3}$
33	If $(x-6)$ is the HCF of $x^2-2x-24$ and x^2-kx-6 then the value of k is	**5**
34	$\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is	$\boldsymbol{\frac{9y}{7}}$
35	$y^2+\frac{1}{y^2}$ is not equal to	$\boldsymbol{\left[y+\frac{1}{y}\right]^2}$
36	$\frac{x}{x^2-25}-\frac{8}{x^2+6x+5}$ gives	$\boldsymbol{\frac{x^2-7x+40}{(x^2-25)(x+1)}}$
37	The square root of $\frac{256\,x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to	$\boldsymbol{\frac{16}{5}\left\lvert\frac{xz^2}{y}\right\rvert}$
38	Which of the following should be added to make x^4+64 a perfect s quare	$\boldsymbol{16x^2}$
39	The solution of $(2x-1)^2=9$ is equal to	$\boldsymbol{-1, 2}$
40	The values of a and b if $4x^4-24x^3+76x^2+ax+b$ is a perfect square are	$\boldsymbol{-120, 100}$
41	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 _____	$\boldsymbol{G.P}$
42	Graph of a linear polynomial is a	**straight line**
43	The number of points of intersection of the quadratic polynomial x^2+4x+4 with the X axis is	**1**
44	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	$\boldsymbol{4\times 3}$
45	If A is a 2×3 matrix and B is a 3×4 matrix, how many columns does AB have	**4**
46	If number of columns and rows are not equal in a matrix then it is said to be a	**rectangular matrix**

47	Transpose of a column matrix is	**row matrix**
48	Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$	$\begin{pmatrix} \mathbf{2} & \mathbf{2} \\ \mathbf{2} & \mathbf{-1} \end{pmatrix}$
49	Which of the following can be calculated from the given matrices A = $\begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$ and B = $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$, (i) A^2 (ii) B^2 (iii) AB (iv) BA	**(ii) and (iii) only**
50	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) $(AB)C = \begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$	**(i) and (ii) only**

Unit-4: GEOMETRY

Sl.No.	QUESTION	ANSWER
51	If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when	$\angle B = \angle D$
52	In ΔLMN, $\angle L = 60°$, $\angle M = 50°$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is	70°
53	If ΔABC is an isosceles triangle with $\angle C = 90°$ and $AC = 5$ cm, then AB is	$5\sqrt{2}\ cm$
54	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 	25 : 4
55	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	$15\ cm$
56	If in ΔABC, DE ∥ BC. $AB = 3.6\ cm$, $AC = 2.4\ cm$ and $AD = 2.1\ cm$ then the length of AE is	1.4 cm
57	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	4 cm
58	In the adjacent figure $\angle BAC = 90°$ and $AD \perp BC$ then 	$BD \cdot CD = AD^2$
59	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?	13 m
60	In the given figure, $PR = 26$ cm, $QR = 24\ cm$, $\angle PAQ = 90°$, $PA = 6$ cm and $QA = 8\ cm$. Find $\angle PQR$ 	90°
61	A tangent is perpendicular to the radius at the	point of contact
62	How many tangents can be drawn to the circle from an exterior point?	two
63	The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70°$ then the value of $\angle AOB$ is	110°
64	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 	4 cm
65	In figure if PR is tangent to the circle at P and O is the centre of the circle, then ∠POQ is 	120°

Unit-5: COORDINATE GEOMETRY

Sl.No.	QUESTION	ANSWER
66	The area of triangle formed by the points (−5, 0) , (0, −5) and (5, 0) is	**25 sq.units**
67	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	$x = 10$
68	The straight line given by the equation $x = 11$ is	**parallel to Y axis**
69	If $(5,7), (3, p)$ and $(6, 6)$ are collinear, then the value of p is	**9**
70	The point of intersection of $3x - y = 4$ and $x + y = 8$ is	**(3, 5)**
71	The slope of the line joining $(12,3)$, $(4,a)$ is $\frac{1}{8}$. The value of 'a' is	**2**
72	The slope of the line which is perpendicular to line joining the points (0, 0) and $(-8,8)$ is	**1**
73	If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then the slope of the perpendicular bisector of PQ is	$-\sqrt{3}$
74	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	$8x + 5y = 40$
75	The equation of a line passing through the origin and perpendicular to the line	$3x + 7y = 0$
76	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 ?	**l_2 and l_4 are perpendicular**
77	A straight line has equation $8y = 4x + 21$. Which of the following is true	**The slope is 0.5 and the y intercept is 2.6**
78	When proving that a quadrilateral is a trapezium, it is necessary to show	**Two parallel and two non-parallel sides**
79	When proving that a quadrilateral is a parallelogram by using slopes you must find	**The slopes of two sides**
80	$(2,1)$ is the point of intersection of two lines.	$x + y = 3$; $3x + y = 7$

Unit-6: TRIGONOMETRY

Sl.No.	QUESTION	ANSWER
81	The value of $sin^2\theta + \frac{1}{1+tan^2\theta}$ is equal to	$\mathbf{1}$
82	$tan\theta\ cosec^2\theta - tan\theta$ is equal to	$\boldsymbol{cot\theta}$
83	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	$\mathbf{7}$
84	If $sin\theta + cos\theta = a$ and $sec\theta + cosec\theta = b$, then the value of $b(a^2-1)$ is equal to	$\boldsymbol{2a}$
85	If $5x = sec\theta$ and $\frac{5}{x} = tan\theta$, then $x^2 - \frac{1}{x^2}$ is equal to	$\boldsymbol{\frac{1}{25}}$
86	If $sin\theta = cos\theta$, then $2tan^2\theta + sin\theta - 1$ is equal to	$\boldsymbol{\frac{3}{2}}$
87	If $x = atan\theta$ and $y = bsec\theta$ then	$\boldsymbol{\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1}$
88	$(1 + tan\,\theta + sec\,\theta)(1 + cot\theta - cosec\theta)$ is equal to	$\mathbf{2}$
89	$a\,cot\theta + b\,cosec\theta = p$ and $b\,cot\theta + a\,cosec\,\theta = q$ then $p^2 - q^2$ is equal to	$\boldsymbol{b^2 - a^2}$
90	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	$\mathbf{60°}$
91	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	$\boldsymbol{\frac{b}{3}}$
92	A tower is 60 m high. Its shadow is x metres shorter when the sun's altitude is 45° than when it has been 30°, then x is equal to	$\boldsymbol{43.92\,m}$
93	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	$\boldsymbol{30, 10\sqrt{3}}$
94	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	$\boldsymbol{\frac{x}{2\sqrt{2}}}$
95	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	$\boldsymbol{\frac{h(1+tan\beta)}{1-tan\beta}}$

Unit-7: MENSURATION

Sl.No.	QUESTION	ANSWER
96	The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is	$136\pi\ cm^2$
97	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	$4\pi r^2$ sq. units
98	The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be	$12\ cm$
99	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	1:4
100	The total surface area of a cylinder whose radius is $\frac{1}{3}$ of its height is	$\frac{8\pi h^2}{9}$ sq. units
101	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	$11200\pi\ cm^3$
102	If the radius of the base of a cone is tripled and the height is doubled then the volume is	made 18 times
103	The total surface area of a hemi-sphere is how much times the square of its radius.	3π
104	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	$4x\ cm$
105	A frustum of a right circular cone is of height 16cm with radii of its ends as 8cm and 20cm. Then, the volume of the frustum is	$3328\ \pi\ cm^3$
106	A shuttle cock used for playing badminton has the shape of the combination of	frustum of a cone and a hemisphere
107	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	2 : 1
108	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	$\frac{4}{3}\ \pi$
109	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	1 : 2
110	The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is	3:1:2

Unit-8: STATISTICS & PROBABILITY

Sl.No.	QUESTION	ANSWER
111	Which of the following is not a measure of dispersion?	**Arithmetic mean**
112	The range of the data 8, 8, 8, 8, 8. . . 8 is	**0**
113	The sum of all deviations of the data from its mean is	**zero**
114	The mean of 100 observations is 40 and their standard deviation is 3. The sum of squares of all deviations is	**160900**
115	Variance of first 20 natural numbers is	**33.25**
116	The standard deviation of a data is 3. If each value is multiplied by 5 then the new variance is	**225**
117	If the standard deviation of x, y, z is p then the standard deviation of $3x + 5$, $3y + 5$, $3z + 5$ is	$\mathbf{3p}$
118	If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is	**3.5**
119	Which of the following is incorrect?	$\mathbf{P(A) > 1}$
120	The probability of a red marble selected at random from a jar containing p red, q blue and r green marbles is	$\mathbf{\frac{p}{p+q+r}}$
121	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	$\mathbf{\frac{7}{10}}$
122	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	**1**
123	Kamalam went to play a lucky draw contest. 135 tickets 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	**15**
124	If a letter is chosen at random from the English alphabets $\{a, b, \ldots, z\}$, then the probability that the letter chosen precedes x	$\mathbf{\frac{23}{26}}$
125	A purse contains 10 notes of Rs.2000, 15 notes of Rs.500, and 25 notes of Rs.200. One note is drawn at random. What is the probability that the note is either a Rs.500 note or Rs.200 note?	$\mathbf{\frac{4}{5}}$