MATHEMATICS SAMPLE PAPER - 2

TIME: 3/15 HRS. **MAX. MARKS :80**

GENERAL INSTRUCTIONS:

1. **All questions are compulsory.**
2.

Section	Number of Questions	Marks for each Question	Total Marks
Section (A)	1(i to xviii), 2 (i to vi) 3(i to xii) = 36	1	36
Section (B)	4 to 13 = 10	2	20
Section (C)	14 to 17 = 4	3	12
Section (D)	18 to 20 = 3	4	12

SECTION-A

1. (i) – (xviii) are multiple choice questions. Select the most appropriate answer from the given options.

(i) LCM and HCF of 12 and 15 will be :
(1) 60 and 3 (2) 24 and 6 (3) 12 and 30 (4) None of these

(ii) If mean = (3 median – mode) × k, then value of k is
(1) 1 (2) 2 (3) $\frac{1}{2}$ (4) $\frac{3}{2}$

(iii) The value of $2\sin^2 60° \cos 60°$ is :
(1) $\frac{4}{3}$ (2) $\frac{5}{2}$ (3) $\frac{3}{4}$ (4) $\frac{1}{3}$

(iv) For what value of k, the following system of equation $kx + 2y = 3$; $3x + 6y = 10$ has a unique solution
(1) $k = 1$ (2) $k \neq 1$ (3) $k = 0$ (4) $k \neq 2$

(v) If $\sin\theta = x$ and $\sec\theta = y$ then value of $\cot\theta$
(1) xy (2) $\frac{x}{y}$ (3) $\frac{1}{xy}$ (4) x + y

(vi) The co-ordinate of mid points joining the line segment of points (6, 8) and (2, 4) will be :
(1) (4, 6) (2) (6, 4) (3) (2, 2) (4) (1, 0)

(vii) If $3\cot\theta = 2$ then the value of $\tan\theta$ is
(1) $\frac{2}{3}$ (2) $\frac{3}{2}$ (3) $\frac{3}{\sqrt{13}}$ (4) $\frac{2}{\sqrt{13}}$

(viii) Ratio in which line segment (1, – 3) and (4, 5) is divided by x-axis is
(1) 5 : 3 (2) 3 : 5 (3) 2 : 1 (4) 1 : 2

(ix) If P(2, p) is the midpoint of line segment joining the points A(6, –5) and B(–2, 11) then value of p is
(1) 1 (2) 0 (3) 2 (4) 3

(x) Distance between A(C, 0) and B(0, –C) is
(1) $\sqrt{2C}$ units (2) $\sqrt{2}$ C units (3) 0 (4) 2C

(xi) A coin is tossed thrice. The probability of getting at least two tails is
(1) $\frac{4}{5}$ (2) $\frac{2}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{2}$

(xii) If the endpoints of a diameter of a circle are (–4, –3) and (2, 7), then the coordinates of the center are:
(1) (1, –2) (2) (0, 0) (3) (2, –1) (4) (–1, 2)

(xiii) If one zero of the polynomial $f(x) = 5x^2 + 13x + k$ is reciprocal to other then the value of k will be:

(1) zero (2) $\frac{1}{5}$ (3) 5 (4) 6

(xiv) Mean of first 5 even natural numbers will be :

(1) 11 (2) 8 (3) 6 (4) 10

(xv) If $6x + y = 10$ then which of the following pair satisfy this equation :

(1)(1, 4) (2) (4, 1) (3) (2, 2) (4) (2, – 2)

(xvi) The height and radius of a right circular cone are 24 cm and 7cm respectively. The slant height of the cone is?

(1) 24cm (2) 31cm (3) 26 cm (4) 25 cm

(xvii) If one of the zeroes of the quadratic polynomial $(a–1)x^2 + ax+1$ is –3, then the value of a is?

(1) $-\frac{2}{3}$ (2) $\frac{2}{3}$ (3) $\frac{4}{3}$ (4) $\frac{3}{4}$

(xviii) The distance of $(\sin\theta, \cos\theta)$ from the origin is?

(1) 1 (2) 0 (3) $\sqrt{2}$ (4) 4

2. Fill in the blanks (i-vi)

(i) A solid sphere of radius r is melted and recast into the shape of a solid cone of height r. The radius of base of the cone is ..... units.

(ii) If α and β are zeroes of polynomial $2y^2 + 7y + 5$; then the value of $\alpha + \beta + \alpha\beta$ is ..... .

(iii) If one zero of polynomial $x^2 – 4x + 1$ is $2 + \sqrt{3}$, then other zero is ..... .

(iv) ΔABC is an isosceles triangle right angled at C with AC = 4 cm. Then length of AB is ..... cm.

(v) A sequence $\{a_n\}$ is given by the formula $a_n = 10 – 3n$ is an A.P ; its common difference is .....

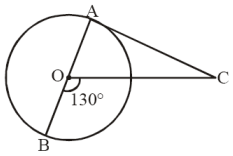
(vi) A coin is tossed twice. The probability of getting both heads is .....

3. Very Short answer type of questions (i-xii)

(i) If $\Delta ABC \sim \Delta RPQ$; AB = 3 cm; BC = 5 cm ; AC = 6 cm ; RP = 6 cm and PQ = 10 cm ; then find QR.

(ii) If the angle between two tangents drawn from an external point P to a circle of radius 'a' and centre O is 60°, then find length of OP.

(iii) In figure AOB is diameter of circle. With centre O, AC is tangent to the circle at A. If $\angle BOC = 130°$, then find $\angle ACO$.



(iv) If $p – 1$; $p + 3$; $3p – 1$ are in AP ; then find p.

(v) Find the value (s) of p for which quadratic equation $x^2 + px + 16 = 0$ has equal roots.

(vi) If $\frac{2x+y+2}{5} = \frac{2x-2y+1}{3} = \frac{3x+2y+1}{6}$ then find x and y.

(vii) The constant polynomial 0 is called ..... polynomial.

(viii) Every point on the graph of a linear equation is ..... of the linear equation.

(ix) A line segment is of length 10 units. If the coordinates of its one end are (2, – 3) and the abscissa of the other end is 10, then its ordinate is

(x) If a 1.5 m tall girl stands at a distance of 3 m from a lamp-post and casts a shadow of length 4.5 m on the ground, then find the height of the lamp-post.

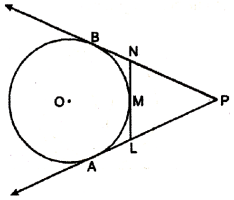
(xi) If the first term (a) of an A.P. is 5 and common difference (d) = – 2 then the 11th term is ?

(xii) If DE||BC in ΔABC, AD = 1.5 cm, BD = 3 cm and AE = 1 cm, then find EC.

SECTION-B

4. Find the coordinates of the point which divides the join of points (–1, 7) and (4, –3) in the ratio 2 : 3.

5. In the figure, PA and PB are two tangents to the circle with centre O. One point M is on the circle, then prove that : PL + LM = PN + MN.



6. The length, breath and height of a wall are 5 m, 30 cm and 3 m. How many bricks will be needed to build of the wall. The demensions of on brick are 20 cm × 10 cm × 7.5 cm.

7. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.

8. Given that $\sqrt{3}$ is an irrational number, then show that $\left(5+2\sqrt{3}\right)$ is also an irrational number.

9. The shadow of a tower standing on a plane ground is found to be 40 m longer when the sun's altitude reduces to 30° from 60°. Find the height of the tower.

10. Prove that the lengths of tangents drawn from an external point to the circle are equal.

11. If three times the larger of the two numbers is divided by the smaller one, we get 4 as quotient and 3 as the remainder. Also, if seven times the smaller number is divided by the larger one, we get 5 as quotient and 1 as remainder. Find the numbers.

12. Find the zeroes of a quadratic polynomial given as $t^2 - 15$ and verify the relationship between the zeroes and the coefficients.

13. If the distance between points (x, 0) and (0,3) is 5, what are the values of x?

SECTION-C

14. Find the area of the sector of a circle with radius 4 cm and of a angle 60°. Also find the area of the corresponding major sector. (Use $\pi = 3.14$)

OR

Find the sum of the first 15 multiples of 8.

15. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 7 cm. Find the height of the cylinder.

OR

The cost of fencing a circular field at the rate Rs. 24 per meter is Rs. 5280 and rate of ploughing is Rs. 0.50 per meter square. Find the cost of ploughing the field.

16. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether it is defective or not. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

OR

The diagonals of quadrilateral ABCD, intersect each other at point O such that $\frac{AO}{BO}=\frac{CO}{DO}$, then prove that ABCD is a trapezium.

17. A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

OR

Solve 2x + 3y = 11 and 2x – 4y = – 24 and hence find the value of 'm' for which y = mx + 3.

SECTION-D

18. Prove that $\sqrt{\left(\frac{\sec\theta+1}{\sec\theta-1}\right)} = \cot\theta + \text{cosec}\,\theta$

OR

If $\frac{\cos A}{\cos B} = m$ and $\frac{\cos A}{\sin B} = n$ then, prove that $(m^2 + n^2)\cos^2 B = n^2$

19. Prove that : $\sec^6\theta - \tan^6\theta = 1 + 3\tan^2\theta + 3\tan^4\theta$

OR

The lengths of 40 leaves in a plant are measured correctly to the nearest millimeter, and the data obtained is represented as in the following table:

Length (in mm)	Number of leaves
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4
172-180	2

Find the median length of the leaves.

20. A life Insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 years.

Age (in years)	**Number of policy holder**
Below 20	2
Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	92
Below 55	98
Below 60	100

OR

The marks distribution of 30 students in a mathematics examination are as follows :

Class interval of marks	10–25	25–40	40–55	55–70	70–85	85–100
Number of students	2	3	7	6	6	6

Find the mean and find also the mode of given data.

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