MATHEMATICS SAMPLE PAPER - 3

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) Which term of the A.P. 21, 42, 63, 85, ... is 210 ?

(1) 9^{th} (2) 10^{th} (3) 11^{th} (4) 12^{th}

(ii) if equation $x^2 + 3ax + k = 0$ has $x = -a$ as solution, then k will be :

(1) $2a^2$ (2) 0 (3) 2 (4) $-2a$

(iii) In the given circle, O is a centre and $\angle BDC = 42°$, then $\angle ACB$ is equal to

(1) 42° (2) 45° (3) 48° (4) 60°

(iv) If the shadow of a tree is $\sqrt{3}$ times of its height, then the angle of elevation will be :

(1) 45° (2) 60° (3) 90° (4) 30°

(v) For an event E, the correct inequality is

(1) $0 < P(E) < 1$ (2) $0 \le P(E) < 1$ (3) $0 < P(E) \le 1$ (4) $0 \le P(E) \le 1$

(vi) Degree of polynomial $y^3 - 2y^2 - \sqrt{3}y + \frac{1}{2}$ is

(1) 1 (2) 2 (3) 3 (4) 4

(vii) Number of cricles through three collinear points is :

(1) One (2) Two (3) Zero (4) Infinite

(viii) The LCM and HCF of two numbers are 36 and 2 respectively. If one of the number is 18, then the other number is

(1) 2 (2) 3 (3) 4 (4) 1

(ix) Find the perpendicular distance of A(4.5,13) from the y-axis.

(1) 4.5 (2) 13 (3) 3 (4) 9

(x) If P(–1, 1) is the midpoint of the line segment joining A(–3, b) and B(1, b + 4), then value of b is

(1) 1 (2) –1 (3) 2 (4) –2

(xi) The ratio of the length of a straight rod to that of its shadow is . Find the angle of elevation of the sun at that time.

(1) 30° (2) 60° (3) 45° (4) 90°

(xii) A rectangular field is 16m long and 10m wide. There is a path nf uniform width all around it having an area of 120 sq.m, then the width of the path is

(1) 5 m (2) 3 m (3) 2m (4) 4 m

(xiii) The use of cumulative frequency table is to find :

(1) mean (2) mode (3) median (4) all of these

(xiv) If the diameter of the circle bisect each of the 2 chords, then the chords will be :

(1) parallel (2) perpendicular (3) intersecting (4) None of these

(xv) The total surface area of a solid hemisphere is :

(1) $3\pi r^2$ (2) $2\pi r^2$ (3) $4\pi r^2$ (4) $\frac{2}{3}\pi r^2$

(xvi) The lines represented by linear equations x=a and y=b are?

(1) intersecting at (a,b) (2) parallel

(3) coincident (4) None

(xvii) The region between a chord and either of the two arcs of circle is called?

(1) sector (2) segment (3) secant (4) quadrant

(xviii) If $1080 = 2^x x 3^y x 5$, then (x-y) is equal to?

(1) 6 (2) -1 (3) 1 (4) 0

2. Fill in the blanks(i-vi)

(i) The coordinates of the point which divides the line segment joining the points (6, 3) and (–4, 5) in the ratio 3 : 2 internally is ..... .

(ii) For the system of equations $5x + 2y = k$, $10x + 4y = 3$, the value of k is ..... for which the given system of equations has infinitely many solutions.

(iii) The values of k is ..... , for which the roots are real and equal in the equation $kx^2 + 4x + 1 = 0$.

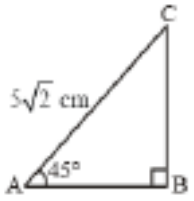
(iv) The value of $\sin45° \sin30° + \cos45° \cos30°$ is ..... .

(v) The surface area of hemisphere is ..... square unit.

(vi) Find the 18th term of the AP $\sqrt{2}, \sqrt{18}, \sqrt{50}, \sqrt{98}, ...$

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

(i) In the adjoining figure, ΔABC is right-angled at B and $\angle A = 45°$. If AC = $5\sqrt{2}$ cm, find BC.

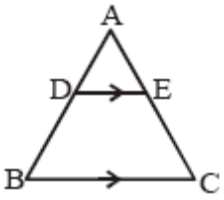


(ii) If $\tan A = \sqrt{3}$, then find the value of cosA

(iii) Find the circumference and area of a circle of diameter 28 cm.

(iv) A die is thrown once. Find the probability of getting a number less than 5.

(v) In ΔABC, DE || BC such that $\frac{AD}{DB} = \frac{3}{5}$ If AC = 5.6 cm then AE = ?



(vi) For what value of p, (–4) is a zero of the polynomial $x^2 - 2x - (7p + 3)$?

(vii) Find the value of k so that the system of equations has no solution:

$3x - y - 5 = 0$; $6x - 2y - k = 0$

(viii) The nth term of an AP is 6n + 2. Find its common difference.

(ix) In a frequency distribution, if a = assumed mean 55, $\sum f_i = 100$, h = 10 and $\sum f_i v_i = -30$, then find the mean of the distribution.

(x) Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere.

(xi) The shadow of a 5 m long stick is 2 m long. At the same time, find the length of the shadow of a 12.5 m high tree.

(xii) A horse is grazing in a field. It is tied to a pole with a rope of length 6 m. The horse moves from point A to point B making an arch with an angle of 70°. Find the area of the sector grazed by the horse.

SECTION-B

4. Write the number of solutions of following linear pairs :

$x + 2y - 8 = 0$ and $2x + 4y = 16$

5. Find the value of :

$2\tan^2 45° + \cos^2 30° - \sin^2 60°$.

6. The angle of elevation of the top of a tower from a point situated at 100 m far from the foot of tower is 30°. Find the height of the tower.

7. If points (3, K) and (K, 5) are equidistant from a point (0, 2) then find the value of K.

8. An observer 1.5 m tall is 28.5 m away from a chimney. The angles of elevation of the top of the chimney from her eyes is 45°. What is the height of the chimney ?

9. In tossing two coins, find the probability of getting at most one tail.

10. If the product of the zeroes of the quadratic polynomial, $p(x) = (k - 2)x^2 - 4x + k$ is 3, write the value of k.

11. Is x = 2, y = 3 a solution of the linear equation $2x + 3y - 13 = 0$?

12. What is the common difference of an AP in which $a_{21} - a_7 = 84$?

13. $\Delta ABC \sim \Delta DEF$. If AB = 4 cm, BC = 3.5 cm, CA = 2.5 cm and DF = 7.5 cm, find the perimeter of ΔDEF.

SECTION-C

14. The ratio of length, breadth and height of a cuboid is 6 : 5 : 4. If its volume is 960 cubic cm then find its length, breadth and height.

OR

Find the point on y-axis which is equidistant from point (–5, –2) and (3, 2).

15. From the top of a building 10 m high, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Find the height of the tower.

OR

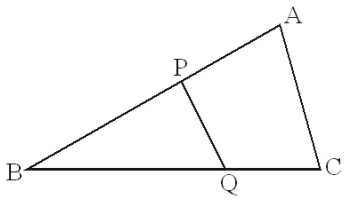
The diameter of a circular pond is 17.5 m. it is enclosed by a circular path of width 2m. Find the cost of making this path at Rs. 25/m^2.

16. Divide 16 into two parts such that 2 times the square of larger part is 164 more than the square of smaller part.

OR

Point D and E lie on sides AB and AC of ΔABC, respectively. If AB = 12 cm, AD =8 cm, AE = 12 cm and AC = 18 cm, then check whether DE ||BC or not.

17. According to figure, in a ΔABC, a line segment PQ which is parallel to side AC, intersects AB and AC such that $\frac{BP}{BA}=\frac{1}{\sqrt{2}}$, then prove that PQ divides the triangle ABC in equal areas.



OR

Draw the graph of equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Find the coordinates of the vertices of triangles formed by these and x-axis and shade the triangular surface.

SECTION-D

18. The angles of depression of two points from the east side of the top of a hill are 30° and 45°. If distance between two points is 1 km, then find height of the hill.

OR

The 8th term of an A.P. is three times its third term. If its 6th term in 22, then find A.P.

19. Prove the following Identity where all angles, for which expression is defined, are acute angles.

$$\frac{1+\cot^2 A}{1+\tan^2 A}=\left(\frac{1-\cot A}{1-\tan A}\right)^2$$

OR

Prove that : $\left(\sec\theta-\tan\theta\right)^2=\frac{1-\sin\theta}{1+\sin\theta}$

20. If mid points of sides of a triangle are (1, 2) (0,1) and (2, –1), then find the vertices of triangle.

OR

The arithmetic mean of following data is 21.5, then find the value of K and find the median of distribution :

x_i	5	15	25	35	45
f_i	6	4	3	K	2

....×××....