

# Sample Paper 3 (Unsolved)

(Basic Level)

Time: 3 hrs.

Max. Marks: 80

## General Instructions

Same as Sample Paper 1

## MATHEMATICS

### Section-A

1.  $3.\overline{27}$  is:

- a. an integer                      b. a rational number  
c. a natural number              d. an irrational number

2. 5th term of the sequence, whose  $n$ th term is  $4n + 2$ , is:

- a. 20                                  b. 22  
c. 18                                  d. None of these

Or

If  $\frac{2}{3}, k, \frac{5k}{8}$  are in AP, then the value of  $k$  is:

- a.  $\frac{8}{33}$                                   b.  $\frac{16}{33}$   
c.  $\frac{5}{13}$                                   d. None of these

3.  $\frac{1 + \tan^2 A}{1 + \cot^2 A}$  is equal to:

- a.  $\sec^2 A$                               b.  $-1$   
c.  $\cot^2 A$                               d.  $\tan^2 A$

Or

If  $\sin A = \frac{1}{2}$ , then the value of  $\cot A$  is:

- a.  $\sqrt{3}$                                   b.  $\frac{1}{\sqrt{3}}$   
c.  $\frac{\sqrt{3}}{2}$                                   d. 1

4. The coordinate of the point which divides the line joining  $(1, -2)$  and  $(4, 7)$  internally in the ratio 1 : 2 is:

- a. 1 : 2                                  b. 2 : 1  
c. 1 : 3                                  d. 3 : 1

5. If one card is drawn from a well-shuffled deck of 52 cards, the probability of drawing red face card is:

- a.  $\frac{3}{26}$                                       b.  $\frac{2}{13}$   
c.  $\frac{1}{52}$                                       d. None of these

Or

Probability of getting an even number on throwing a die is:

- a.  $\frac{1}{6}$                                       b.  $\frac{1}{2}$   
c.  $\frac{5}{6}$                                       d.  $\frac{1}{4}$

6. The polynomial of the form  $ax^2 + bx + c$ ,  $a = 0$  is of type .....

7. The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding .....

8. A line which intersects a circle in two distinct points is called a ..... of the circle.

Or

A tangent PQ at a point P to a circle of radius 5 cm meets a line through the centre O at a point Q, so that  $OQ = 13$  cm, then length of PQ is .....

9. The angle of ..... of an object viewed is the angle formed by the line of sight with the horizontal when it is below the horizontal level.

10. Distance moved or covered by a wheel in 1 rotation is equal to ..... of the wheel.

Or

The diameter of a circle whose area is equal to the sum of the areas of the two circles of radii 24 cm and 7 cm is .....

11. The equation  $2x^2 - 7x + 6 = 0$  has 2 as a root. (T/F)
12. If AD and PM are medians of triangles ABC and PQR, respectively where  $\Delta ABC \sim \Delta PQR$ , then  $\frac{AB}{PQ} = \frac{AD}{PM}$ . [T/F]
13. If the values of mean and median are 53.6 and 55.81, then the value of mode is 60.23. [T/F]
- Or
- In the frequency distribution, if  $\sum f_i x_i = 750$  and  $\sum f_i = 25$ , the mean of the distribution is 25. [T/F]
14. The tangent of a circle makes an angle of  $90^\circ$  with radius at point of contact. [T/F]
15. The volume of the material in a hollow body is equal to the difference between the external volume and internal volume. [T/F]
16. If the lines given by  $3x + 2ky = 2$  and  $2x + 5y + 1 = 0$  are parallel, then find the value of  $k$ .

Or

How many solutions does the pair of equations  $y = 0$  and  $y = -5$  have?

17. 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.
18. To divide a line segment AB in the ratio 2 : 5, first a ray AX is drawn, so that  $\angle BAX$  is an acute angle and then at equal distances, how many points are located on the ray AX?
19. Evaluate  $10 \cdot \frac{1 - \cot^2 45^\circ}{1 + \sin^2 90^\circ}$ .

20. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. Find the ratio of the volume of the smaller cone to the whole cone.

### Section-B

21. Find the HCF (865, 255) using Euclid's division lemma.
22. On dividing  $p(x)$  by a polynomial  $x - 1 - x^2$ , the quotient and remainder were  $(x - 2)$  and 3 respectively. Find  $p(x)$ .
23. Find the values of  $y$  for which the distance between the points A (3, -1) and B (11,  $y$ ) is 10 units.

Or

If the point C ( $K$ , 4) divides the join of points A(2, 6) and B (5, 1) in the ratio 2 : 3, find the value of  $K$ ?

24. A survey was conducted by a group of students as a part of their environment awareness programme, in which they collected the following data regarding the number of plants in 20 houses in a locality. Find the mean number of plants per house:

Number of plants	Number of houses
0-2	1
2-4	2
4-6	1
6-8	5
8-10	6
10-12	2
12-14	3

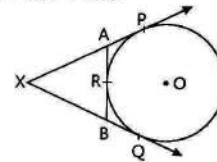
Or

The following is the distribution of weights (in kg) of 40 persons:

Weight (in kg)	No. of persons
40-45	4
45-50	4
50-55	13
55-60	5
60-65	6
65-70	5
70-75	2
75-80	1

Construct a cumulative frequency distribution (of the less than type) table for the above data.

25. Prove that  $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$
26. In given figure, XP and XQ are two tangents to the circle with centre O, drawn from an external point X. ARB is another tangent, touching the circle at R. Prove that  $XA + AR = XB + BR$ .



### Section-C

27. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?



28. Solve for  $x$ :  $9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$

29. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

Or

If AD and PM are medians of triangles and PQR, respectively where  $\Delta ABC \sim \Delta PQR$ , prove that  $\frac{AB}{PQ} = \frac{AD}{PM}$ .

30. Solve for  $x$  and  $y$ :

$$71x + 37y = 253 \text{ and } 37x + 71y = 287.$$

31. If A(-2, 1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram ABCD, find the values of  $a$  and  $b$ . Hence find the lengths of its sides.

32. If  $4 \tan \theta = 3$ , evaluate  $\left( \frac{4 \sin \theta - \cos \theta + 1}{4 \sin \theta + \cos \theta - 1} \right)$ .

Or

Prove that  $\sqrt{\frac{1 + \sin A}{1 - \sin A}} + \sqrt{\frac{1 - \sin A}{1 + \sin A}} = 2 \sec A$ .

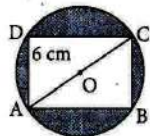
33. The average score of boys in the examination of a school is 71 and that of the girls is 73. The average score of the school in the examination is 71.8. Find the ratio of number of boys to the number of girls who appeared in the examination.

Or

The following data are related to IQ of 100 students. Find the median IQ:

IQ	Frequency
75-84	8
85-94	11
95-104	26
105-114	31
115-124	18
125-134	4
135-144	2

34. Find the area of the shaded region in given figure, if ABCD is a rectangle with sides 8 cm and 6 cm and O is the centre of circle. (Take  $\pi = 3.14$ )



### Section-D

35. The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is  $45^\circ$ . If the angle of elevation of the top of a flagstaff fixed at the top of the tower at A is  $60^\circ$ , then find the height of the flagstaff. (Use  $\sqrt{3} = 1.732$ )

Or

A boy Harpreet Singh standing on the top of a hotel, which is on the sea-shore, finds that a boat coming towards him takes 10 minutes for the angle of depression to change from  $30^\circ$  to  $60^\circ$ . How soon will the boat reach the sea-shore?

36. If a polynomial  $8x^4 - 8x^3 - 18x^2 - px - q$  is exactly divisible by  $4x^2 - 4x + 1$ , then find the values of  $p$  and  $q$ .

37. Out of a deck of 52 playing cards, two black kings and 4 red cards (not king) are removed. A card is drawn at random. Find the probability that the card drawn is:  
(i) a black jack. (ii) a black queen.  
(iii) a black card. (iv) a king.

Or

Cards marked with numbers 1 to 100 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that number on the card is:

- (i) an even number
- (ii) a number less than 4
- (iii) a multiple of 6
- (iv) a number divisible by 3.

38. A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of the hemisphere is 3.5 cm and the total wood used in the making of toy is  $166\frac{5}{6} \text{ cm}^3$ . Find the height of the toy. Also, find the cost of painting the hemispherical part of the toy at the rate of ₹ 10 per  $\text{cm}^2$ .

39. Construct  $\Delta PQR$  with  $QR = 6 \text{ cm}$ ,  $\angle Q = 60^\circ$  and  $PQ = 5 \text{ cm}$ . Construct  $\Delta P'QR'$  similar to  $\Delta PQR$  with  $QR' = 8 \text{ cm}$ .

40. If  $p$ th,  $q$ th and  $r$ th terms of an AP are  $a$ ,  $b$ ,  $c$  respectively, then show that:  
 $(a - b)r + (b - c)p + (c - a)q = 0$ .

## Answer Key

### Sample Paper-3

1. (b) 2. (b) OR (b) 3. (d) OR (a) 4. (b) 5. (a) OR (b) 6. linear 7. sides 8. secant OR 12 cm 9. depression
10. circumference OR 50 cm 11. True 12. True 13. True OR False 14. True 15. True 16.  $\frac{15}{4}$  OR no solution
17. QR = 12 cm 18. 7 19. 0 20. 1 : 8 21. 5 22.  $p(x) = -x^3 + 3x^2 - 3x + 5$  23. 5 and -7 OR  $k = \frac{16}{5}$  24. 8.1
27. 36 minutes 28.  $\frac{2a+b}{3}$  and  $\frac{a+2b}{3}$  29.  $x = 2$  and  $y = 3$  30.  $\sqrt{10}$  units (each sides) 31.  $\frac{13}{11}$  32. 3 : 2
- OR 106.1 34.  $30.5 \text{ cm}^2$  35. 87.84 m OR 15 minute 36.  $p = -20$  and  $q = 5$  37. (i)  $\frac{1}{23}$  (ii)  $\frac{1}{23}$  (iii)  $\frac{12}{23}$  (iv)  $\frac{1}{23}$
- OR (i)  $\frac{1}{2}$  (ii)  $\frac{3}{100}$  (iii)  $\frac{4}{25}$  (iv)  $\frac{33}{100}$  38. ₹ 770