

# Sample Paper 3 (Unsolved)

## (Standard Level)

Time: 3 hrs.

Max. Marks: 80

### General Instructions

### MATHEMATICS

Same as Sample Paper 1

#### Section-A

1. One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 5, is:

- a.  $\frac{1}{5}$       b.  $\frac{3}{5}$       c.  $\frac{4}{5}$       d.  $\frac{1}{3}$

Or

The probability of getting a 53 thursday in a leap year is:

- a.  $\frac{1}{7}$       b.  $\frac{3}{7}$       c.  $\frac{2}{7}$       d.  $\frac{4}{7}$

2. If two positive integers  $a$  and  $b$  are written as  $a = x^3y$  and  $b = xy^3$ ; where  $x, y$  are prime numbers, then HCF ( $a, b$ ) is:

- a.  $xy$       b.  $xy^2$   
c.  $x^3y^3$       d.  $x^2y^2$

3. The ratio of the sides of the triangle to be constructed with the corresponding sides of the given triangle is known as:

- a. scale factors      b. length factor  
c. side factor      d. K-factor

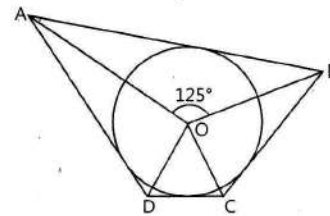
Or

To construct a triangle similar to a given  $\Delta ABC$  with its sides  $\frac{3}{7}$  of the corresponding sides of  $\Delta ABC$ , first

draw a ray  $BX$  such that  $\angle CBX$  is an acute angle and  $X$  lies on the opposite side of  $A$  with respect to  $BC$ . Then locate points  $B_1, B_2, B_3, \dots$  on  $BX$  at equal distances and next step is to join:

- a.  $B_{10}$  to  $C$       b.  $B_3$  to  $C$   
c.  $B_7$  to  $C$       d.  $B_4$  to  $C$

4. In figure, if  $\angle AOB = 125^\circ$ , then  $\angle COD$  is equal to:



- a.  $62.5^\circ$       b.  $45^\circ$       c.  $35^\circ$       d.  $55^\circ$

5. If  $\cos 9\alpha = \sin \alpha$  and  $9\alpha < 90^\circ$ , then the value of  $\tan 5\alpha$  is:

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

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

Or

If AD is an altitude of an equilateral  $\triangle ABC$  and if AD as base another equilateral triangle ADE is constructed then  $\text{ar}(\triangle ADE) : \text{ar}(\triangle ABC) = \dots\dots\dots$

7. The common point of a tangent and the circle is called point of .....
8. Suppose two zeroes of cubic polynomial  $ax^3 + bx^2 + cx + d$  are zero. The third zero is .....
9. If we construct the pair of tangents from a point A at a distance of 26 cm from the centre of the circle is 10 cm, then the radius of the circle is .....
10. If the lines given by  $3x + 4ky = 2$  and  $2x + 7y = 1$  are parallel, then the value of  $k$  is .....
11. If the 3rd and the 9th terms of an AP are 4 and  $-8$  respectively, then 5th term of this AP is 0. (T/F)

Or

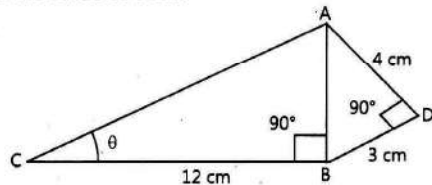
20 terms of AP 18, 16, 14, should be taken so that their sum is zero. (T/F)

12. The distance between points P ( $a \sin \phi$ , 0) and Q ( $0, -a \cos \phi$ ) is a. (T/F)
13. If  $D > 0$ , i.e.  $b^2 - 4ac > 0$ , then the roots are real and equal. (T/F)
14. A solid sphere of radius  $r$  is melted and cast into the shape of a solid cone of height  $r$ , the radius of the base of the cone is  $3r$ . (T/F)
15. The region bounded by a chord and the corresponding arc of the circle is called the segment of the circle. (T/F)

Or

If a square is inscribed in a circle, then the ratio of the areas of the circle and the square is  $2 : \pi$ .

16. In figure, AD = 4 cm, BD = 3 cm and CB = 12 cm, then find the value of  $\cot \theta$ .



17. Find the median of the data, using an empirical relation when it is given that mode = 12.4 and mean = 10.5.

Or

If  $\sum f_i = 15$ ,  $\sum f_i x_i = 3p + 36$  and mean of the distribution is 3, then find the value of  $p$ .

18. If the height and length of the shadow of a man are the same, then find the angle of elevation of the Sun.
19. If the corresponding medians of two similar triangles are in the ratio 5 : 7, then find the ratio of their corresponding sides.

Or

In  $\triangle PQR$ , S and T are points on the sides PQ and PR respectively such that  $ST \parallel QR$ . If  $PS = 4$  cm,  $PQ = 9$  cm and  $PR = 4.5$  cm, then find PT.

20. If two cubes of edge 4 cm each are joined end to end, find the surface area of the resulting cuboid.

### Section-B

21. Find a quadratic polynomial whose zeroes are  $\frac{3 + \sqrt{5}}{5}$  and  $\frac{3 - \sqrt{5}}{5}$ .

Or

If  $\alpha$  and  $\beta$  are the zeroes of  $p(x) = 4x^2 + 3x + 7$ , then find  $\frac{1}{\alpha} + \frac{1}{\beta}$ .

22. Divide a line segment of length 4.8 cm in the ratio of 3 : 5 internally.
23. Write the coordinates of a point on X-axis which is equidistant from the points  $(-3, 4)$  and  $(7, 6)$ .
24. Write down the decimal expansions of the rational numbers given below which have terminating decimal expansions.  
 (i)  $\frac{13}{3125}$                       (ii)  $\frac{29}{343}$ .
25. There are 50 students in a class, out of these 35 are boys and 15 are girls. From these students, one is chosen at random. What is the probability that the chosen student is a (i) boy (ii) girl?

Or

Find the probability the number selected at random from the numbers 3, 4, 4, 4, 5, 5, 6, 6, 6, 7 will be their mean.

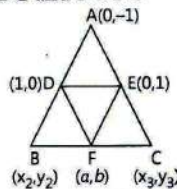
26. The following is the distribution of weights (in kg) of 40 persons:

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.

### Section-C

27. In figure, ABC is a triangle coordinates of whose vertex A are (0,-1). D and E respectively are the mid-points of the sides AB and AC and their coordinates are (1,0) and (0,1) respectively. If F is the mid-point of BC, find the areas of DABC and DDEF.

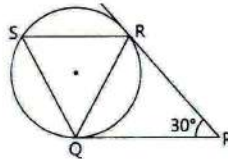


28. Prove that  $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$ .

Or

If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , show that  $(\cos \theta - \sin \theta) = \sqrt{2} \sin \theta$ .

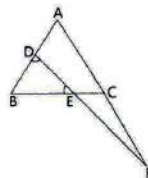
29. In the given figure, tangents PQ and PR are drawn to a circle such that  $\angle RPQ = 30^\circ$ . A chord RS is drawn parallel to the tangent PQ. Find  $\angle RQS$ .



30. Use Euclid's division lemma to show that the square of any positive integer is either of form  $3m$  or  $3m + 1$  for some integer  $m$ .
31. If two poles 5 m and 15 m high are 100 m apart, then find the height of the point of intersection of the line joining the top of each pole to the foot of the opposite pole.

Or

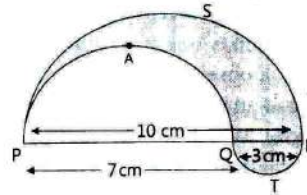
In the figure  $\angle BED = \angle BDE$  and E divides BC in the ratio 2 : 1. Prove that  $AF \times BE = 2AD \times CF$ .



32. Find the quadratic polynomial, whose zeroes are in the ratio 2 : 3 and their sum is 15.
33. A cow is tied with a rope of length 7 m at a corner of a rectangular field of dimensions 20 m  $\times$  16 m. Find the area of the field in which the cow cannot graze.

Or

In the given figure, PSR, RTQ and PAQ are three semicircles of diameter 10 cm, 3 cm and 7 cm respectively. Find the perimeter of shaded region. (Take  $\pi = 3.14$ )



34. Solve for  $x$  and  $y$ :  $\frac{5}{x} - \frac{3}{y} = 1$ ,  $\frac{3}{2x} + \frac{2}{3y} = 5$  ( $x \neq 0, y \neq 0$ ) and hence find the value of 'a' for which  $y = ax - 4$ .

### Section-D

35. The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/h.
36. An open metallic bucket is in the shape of a frustum of a cone. If the diameter of the two circular ends of the bucket are 45 cm and 25 cm and the vertical height of the bucket is 24 cm, find the area of the metallic sheet used to make the bucket. Also find the volume of the water it can hold.

$$\left(\text{Use } \pi = \frac{22}{7}\right)$$

Or

A metallic right circular cone 20 cm high and whose vertical angle is  $60^\circ$  is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter  $\frac{1}{16}$  cm, find the length of the wire. (Use  $\pi = \frac{22}{7}$ )

37. Calculate the mean of the following frequency distribution:

Class	Frequency
10-30	5
30-50	8
50-70	12
70-90	20
90-110	3
110-130	2

38. The first term of an AP is 3, the last term is 83 and the sum of all its terms is 903. Find the number of terms and the common difference of the AP.
39. In an equilateral  $\Delta ABC$ , D is a point on side BC such that  $BD = \frac{1}{3}BC$ . Prove that  $9AD^2 = 7AB^2$ .

40. A fire in a building B is reported on telephone to two fire stations E and F, 10 km apart from each other on a straight road. E observes that the fire is at an angle of  $60^\circ$  to the road and F observes that it is at an angle of  $45^\circ$  to the road. Which station would send its team and how much will this team have to travel?

Or

A moving boat is observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from  $60^\circ$  to  $45^\circ$  in 2 minutes. Find the speed of the boat in m/min.

## Answer Key

### Sample Paper-3

1. (a) OR (c)    2. (a)    3. (a) OR (c)    4. (d)    5. (c)    6. sides OR  $\frac{3}{4}$     7. contact    8.  $\frac{-b}{a}$     9. 24 cm    10.  $\frac{21}{8}$
11. True OR False    12. True    13. False    14. False    15. True OR False    16.  $\cot\theta = \frac{12}{5}$     17. 11.13 OR  $p = 3$
18.  $\theta = 45^\circ$     19. 5 : 7 OR PT = 2 cm    20.  $160 \text{ cm}^2$     21.  $p(x) = k(25x^2 - 30x + 4)$     23. (3, 0)    24. (i) 0.00416
- (ii) Non-terminating repeating decimal    25. (i)  $\frac{7}{10}$  (ii)  $\frac{3}{10}$  OR 0.2    27. 4 sq. unit and 1 sq. unit    29.  $\angle RQS = 30^\circ$
31.  $\frac{15}{4} \text{ m}$     32.  $p(x) = x^2 - 15x + 54$     33.  $281.5 \text{ m}^2$  OR 31.4 cm    34.  $x = \frac{1}{2}$ ,  $y = \frac{1}{3}$  and  $a = \frac{26}{3}$     35. 80 km/h
36.  $3351.07 \text{ cm}^2$  and  $23728.57 \text{ cm}^3$  OR 7964.44 m    37. 65.6    38.  $n = 21$  and  $d = 4$     40. E would send his team and will travel 7.32 km distance.