

SAMPLE PAPER

TIME : 3 HRS.

MAX. MARKS : 80

GENERAL INSTRUCTIONS :

- ▶ All questions are compulsory.
- ▶ The question paper consists of 40 questions divided into four sections A, B, C and D.
- ▶ Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- ▶ There is no overall choice. However, internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- ▶ Use of calculators is not permitted.

SECTION-A

Q.1 - 10 are multiple choice questions. Select the most appropriate answer from the given options.

1. For positive integers a and 3 , there exists unique integers q and r such that $a = 3q + r$, where r must satisfy.

(1) $0 \leq r < 3$ (2) $1 < r < 3$ (3) $0 < r < 3$ (4) $0 < r \leq 3$
2. The number of polynomials having zeroes as -2 and 5 is

(1) 1 (2) 2 (3) 3 (4) more than 3
3. Given that $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to

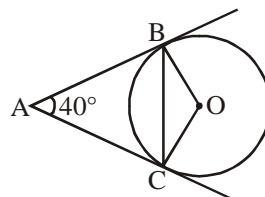
(1) $\frac{b}{\sqrt{b^2 - a^2}}$ (2) $\frac{b}{a}$ (3) $\frac{\sqrt{b^2 - a^2}}{b}$ (4) $\frac{a}{\sqrt{b^2 - a^2}}$
4. In an AP, if $a = 3.5$, $d = 0$, $n = 101$ then a_n is

(1) 01 (2) 3.5 (3) 103.5 (4) 104.5
5. ABC and BDE are two equilateral triangles such that D is midpoint of BC. Ratio of areas of triangles ABC and BDE is

(1) 2 : 1 (2) 1 : 4 (3) 1 : 2 (4) 4 : 1
6. Ratio of sides a right triangle with respect to its acute angles are known as

(1) Trigonometric identities (2) Trigonometry
 (3) Trigonometric ratios of the angles (4) None of these
7. In figure AB and AC are tangent with centre O and $\angle BAC = 40^\circ$, then $\angle BOC$ is equal to

(1) 40° (2) 50° (3) 140° (4) 150°



8. The radii of two circles are 3 cm and 4 cm respectively. The diameter of the circle having area equal to sum of the areas of two circles (in cm) is

(1) 5 (2) 7 (3) 10 (4) 14

9. The radius (in cm) of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is
 (1) 4.2 (2) 2.1 (3) 8.1 (4) 1.05
10. If $\sin\theta = \cos\theta$, then the value of $2\tan\theta + \cos^2\theta$ is
 (1) 2 (2) $\frac{5}{2}$ (3) 4 (4) None of these

Q.11 - 15 Fill in the blanks.

11. Two cubes each with 6 cm edge are joined end to end. The surface area of resulting cuboid is _____.
12. Construction of cumulative frequency table is useful in determining the _____.
13. If the product of zeroes of $x^2 - 3kx + 2k^2 - 1$ is 7 then values of k are _____ and _____.
14. If $(p - 1)$; $(p + 3)$; $(3p - 1)$ are in AP, then p is equal to _____.
15. $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$ is equal to _____.

OR

$\cot^2 53^\circ - \sec^2 37^\circ$ is equal to _____.

Q.16 - 20 Answer the following :

16. Find the values of k for which the quadratic equation $9x^2 - 3kx + k = 0$ has equal roots.

OR

Find the value(s) of k for which the equation $x^2 + 5kx + 16 = 0$ has real and equal roots.

17. AOBC is a rectangle whose three vertices are A(0, 3), O(0, 0) and B(5, 0). Find the length of its diagonal.
18. If $\triangle ABC \sim \triangle QRP$, $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \frac{9}{4}$, AB = 18 cm and BC = 15 cm, then find the length of PR.
19. If $\sin^2 A = 2 \sin A$ then find the value of A.
20. In an AP, if the common difference (d) = -4, and the seventh term (a_7) is 4, then find the first term.

SECTION-B

21. Evaluate $\frac{3\tan^2 30^\circ + \tan^2 60^\circ + \operatorname{cosec} 30^\circ - \tan 45^\circ}{\cot^2 45^\circ}$
22. Five cards-the ten, jack, queen, king and ace of diamonds are well-shuffled with their face downwards. One card is then picked up at random.
 (i) What is the probability that the card is the queen?
 (ii) If the queen is drawn and put aside, what is the probability that the second card picked up is an ace?
23. The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, find the other number.

OR

Show that $7 - \sqrt{5}$ is irrational, given that $\sqrt{5}$ is irrational.

24. Find the 20th term from the last term of the AP 3, 8, 13, ..., 253

OR

If 7 times the 7th term of an A.P is equal to 11 times its 11th term, then find its 18th term.

25. Find the coordinates of the point P which divides the join of A(-2, 5) and B(3, -5) in the ratio 2 : 3.
26. A bag contains cards numbered from 1 to 49. A card is drawn from the bag at random, after mixing the cards thoroughly. Find the probability that the number on the drawn card is
 (i) a multiple of 5
 (ii) a perfect square

SECTION-C

27. Prove that $\sin\theta(1 + \tan\theta) + \cos\theta(1 + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$
28. A girl empties a cylindrical bucket full of sand, of base radius 18 cm and height 32 cm, on the floor to form a conical heap of sand. If the height of this conical heap is 24 cm, then find its slant height correct up to one place of decimal.

OR

A solid sphere of radius 3 cm is melted and then recast into small spherical balls each of diameter 0.6 cm. Find the number of balls.

29. If n is an odd positive integer, show that $(n^2 - 1)$ divisible by 8.
30. Obtain all other zeros of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeros are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.
31. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

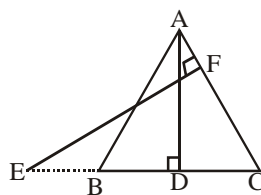
OR

Places A and B are 80 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction they meet in 8 hours and if they move towards each other they meet in 1 hour 20 minutes. Find the speed of cars.

32. The points $A(1, -2)$, $B(2, 3)$, $C(k, 2)$ and $D(-4, -3)$ are the vertices of a parallelogram. Find the value of k .
33. The table shows the daily expenditure on grocery of 25 households in a locality. Find the modal daily expenditure on grocery by a suitable method.

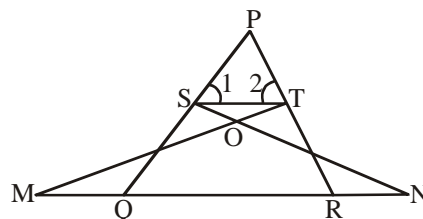
| Daily Expenditure (in `) | 100 – 150 | 150 – 200 | 200 – 250 | 250 – 300 | 300 – 350 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| No of households | 4 | 5 | 12 | 2 | 2 |

34. In the given figure, $AB = AC$. E is a point on CB produced. If AD is perpendicular to BC and EF perpendicular to AC , prove that $\triangle ABD$ is similar to $\triangle CEF$.



OR

In figure $\angle 1 = \angle 2$ and $\triangle NSQ \cong \triangle MTR$, then prove that $\triangle PTS \cong \triangle PRQ$.



SECTION-D

35. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{5}{3}$ of the corresponding sides of the triangle ABC (i.e. of scale factor $\frac{5}{3}$).

36. If S_n denotes the sum of the first n terms of an AP, prove that $S_{30} = 3(S_{20} - S_{10})$.

OR

The sum of the first 7 terms of an AP is 63 and the sum of its next 7 terms is 161. Find the 28th term of this AP.

37. Prove that in a right angled triangle square of the hypotenuse is equal to sum of the squares of other two sides.

38. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from the point.

OR

A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45° , how long will the car take to reach the observation tower from this point?

39. The height of a cone is 10 cm. The cone is divided into two parts using a plane parallel to its base at the middle of its height. Find the ratio of the volume of two parts.

40. The distribution below gives the marks of 100 students of a class.

| Marks | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|--------------------|-----|------|-------|-------|-------|-------|-------|-------|
| Number of studnets | 4 | 6 | 10 | 10 | 25 | 22 | 18 | 5 |

Draw a less than type and a more than type ogive from the given data. Hence, obtain the median marks from the graph.

OR

The median of the following data is 525. Find the values of x and y if the total frequency is 100.

| Class Interval | Frequency |
|----------------|-----------|
| 0 – 100 | 2 |
| 100 – 200 | 5 |
| 200 – 300 | x |
| 300 – 400 | 12 |
| 400 – 500 | 17 |
| 500 – 600 | 20 |
| 600 – 700 | y |
| 700 – 800 | 9 |
| 800 – 900 | 7 |
| 900 – 1000 | 4 |