
SAMPLE QUESTION PAPER - I

MATHEMATICS, SA - 1

Time allowed : 3 hours

Maximum Marks : 90

General Instructions

1. All questions are compulsory.
2. The question paper consists of 34 questions divided into four sections A, B, C and D. Section A comprises of 8 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 10 questions of 4 marks each.
3. Question numbers 1 to 8 in Section A are multiple choice questions where you are to select one correct option out of the given four.
4. Use of calculator is not permitted.

SECTION – A

1. In Euclid Division Lemma when $a = bq + r$, where a, b are positive integer, choose the correct option :
(a) $0 < r \leq b$ (b) $0 \leq r < b$
(c) $0 < r < b$ (d) $0 \leq r \leq b$
2. What type of graph of the polynomial $f(x) = -x^2 + 3x - 4$ represents ;
(a) Straight line (b) upward parabola
(c) downward parabola (d) none of these
3. In the corresponding sides of two similar triangles are in the ratio 5 : 7, then the ratio of their perimeter is
(a) 2 : 7 (b) 5 : 7
(c) 5 : 2 (d) 7 : 5

4. If $x = \sqrt{7} \sin \theta$, $y = \sqrt{7} \cos \theta$ then the value of $x^2 + y^2$ is :
- (a) 0 (b) 1
- (c) 7 (d) $\frac{1}{7}$
5. The decimal expansion of the rational number $\frac{21}{7 \times 2^3 \times 5^4}$ will terminate after decimal places.
- (a) 3 (b) 4
- (c) 5 (d) never
6. The point of intersection of the lines $x - 2y = 6$ and y-axis is
- (a) $(-3, 0)$ (b) $(0, 6)$
- (c) $(6, 0)$ (d) $(0, -3)$
7. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 171^\circ$ is
- (a) 1 (b) -1
- (c) 0 (d) $\frac{1}{\sqrt{2}}$
8. If the mode of observations 2, 3, 5, 4, 2, 6, 3, 5, 5, 2 and x is 2, then the value of x is :
- (a) 2 (b) 3
- (c) 4 (d) 5

SECTION – B

9. Whether 6^n can end with the digit 0 for any natural number. Give reason for your answer.
10. If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 4, find the value of a.
11. If $\triangle ABC \sim \triangle QRP$, $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle PQR)} = \frac{9}{4}$, $AB = 18$ cm, $BC = 15$ cm, find the value of PR.

12. If $16 \cot A = 12$ then find the value of

$$\frac{\sin A + \cos A}{\sin A - \cos A}.$$

13. Find a quadratic polynomial whose zeroes are 2 and -3 , verify the relation between the coefficients and zeroes of the polynomial.
14. Find x , if the median of the observations in ascending order
24, 25, 26, $x + 2$, $x + 3$, 30, 31, 34 is 27.5.

SECTION – C

15. A girl Rita of height 90 cm is walking away from the base of a lamp post at a speed of 1.2 m/sec. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds?
16. Find the other zeroes of the polynomial for $x^4 - 20x^3 + 23x^2 + 5x - 6$, if two of its zeroes are 2 and 3.
17. Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m .
18. If $\sin(3x + 2y) = 1$ and $\cos(3x - 2y) = \frac{\sqrt{3}}{2}$ when $0 \leq 3x + 2y \leq 90^\circ$ then find the value of x and y .
19. Find the largest positive integer that will divide 398, 436 and 542 leaving remainders 7, 11 and 15 respectively.
20. Solve for x and y , when $x \neq \pm y$

$$\frac{30}{x - y} + \frac{44}{x + y} = 10$$

$$\frac{40}{x - y} + \frac{55}{x + y} = 13$$

21. The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Find the values of x and y .

Class interval	0–20	20–40	40–60	60–80	80–100	100–120
Frequency	5	x	10	y	7	8

22. The diagonals of a trapezium PQRS intersect each other at the point O, $PQ \parallel RS$ and $PQ = 3 RS$, find the ratio of the areas of $\triangle POQ$ and $\triangle ROS$.
23. If A, B and C are interior angles of a $\triangle ABC$, then show that

$$\sin\left(\frac{B + C}{2}\right) = \cos \frac{A}{2}$$

24. Find the median weight of the following data :

Weight in (kg.)	38–40	40–42	42–44	44–46	46–48	48–50	50–52
No. of Students	3	2	4	5	14	4	3

SECTION – D

25. Prove that $\sqrt{5}$ is an irrational number and hence prove $2 - \sqrt{5}$ is an irrational number.
26. Draw the graph of the following pair of linear equations $x + 3y = 6$ and $2x - 3y = 12$. Find the ratio of the areas of the two triangles formed by first line, $x = 0$, $y = 0$ and second line $x = 0$, $y = 0$.
27. Prove that

$$\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$$

28. Change the distribution to a more than type distribution and draw its ogive

Class Interval	50-55	55-60	60-65	65-70	70-75	75-80
Frequency	2	8	12	24	38	16

29. On dividing $4x^3 - 8x^2 + 8x + 1$ by a polynomial $d(x)$, the quotient and remainder are $(2x^2 - 3x + 2)$ and $(x + 3)$ respectively, find $d(x)$.
30. State and prove converse of pythagoras theorem.
31. Prove the following identity :

$$\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A.$$

32. $\triangle ABC$ is right angled at C. Let $BC = a$, $CA = b$, $AB = c$, $CD \perp AB$, $CD = p$. Prove that

(i) $cp = ab$

(ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

33. Evaluate :

$$\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$$

34. In a city, the number of old aged citizens lived in an old age home is as given below

Age (in years)	No. of People
50–55	10
55–60	12
60–65	17
65–70	13
70–75	16
75–80	22

- (a) Find mean of the above data?
- (b) Why the old people are neglected in the society and what are the various steps to be taken to improve the status of old people in the society?
- (c) What value is depicted in this question?

ANSWERS

- | | |
|----------------|-----------|
| 1. b | 2. c |
| 3. b | 4. c |
| 5. b | 6. d |
| 7. c | 8. a |
| 10. $a = -3/2$ | 11. 10 cm |

12. 7
13. $x^2 + x - 6$
14. $x = 25$
15. 1.6 m
16. $\pm \frac{1}{2}$
18. $x = 20, y = 15$
19. 17
20. $x = 8, y = 3$
21. $x = 8, y = 12$
22. 9 : 1
24. 46.5 kg
26. 1 : 2
29. $d(x) = 2x - 1$
33. $\frac{67}{12}$
34. (a) 66.8
- (b) Generation gap, Lack of social and moral values.
- (c) Impart social and moral values in the society.