DESIGN OF SAMPLE QUESTION PAPER

MATHEMATICS, SA - 1

Type of Question	*Marks per Question*	*Total No. of Questions*	*Total Marks*
MCQ	1	10	10
SA - I	2	8	16
SA - II	3	10	30
LA	4	6	24
Total		34	80

BLUE PRINT
SAMPLE QUESTION PAPER

Topic/Unit	*MCQ*	*SA (I)*	*SA (II)*	*LA*	*Total*
Number System	2 (2)	1 (2)	2 (6)	–	5 (10)
Algebra 8 (20)		2 (2)	2 (4)	2 (6)	2 (8)
Geometry	1 (1)	2 (4)	2 (6)	1 (4)	6 (15)
Trigonometry	4 (4)	1 (2)	2 (6)	2 (8)	9 (20)
Statistics	1 (1)	2 (4)	2 (6)	1 (4)	6 (15)
Total	10 (10)	8 (16)	10 (30)	6 (24)	34 (80)

Note : Marks are within brackets.

SAMPLE QUESTION PAPER - I

MATHEMATICS, SA - 1

Time allowed : 3½ hours ***Maximum Marks : 80***

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 10 questions of 1 mark each. Section B comprises of 8 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 6 questions of 4 marks each.
3. Question numbers 1 to 10 in Section A are multiple choice questions where you are to select one correct option out of the given four.
4. There is no overall choice. How ever, internal choice has been provided in 1 question of 2 marks 3 questions of three marks each and 2 questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

SECTION A

Question number 1 to 10 are of 1 mark each

1. ΔABC is right angled at A. The value of tan B . tan C is _____

   (a) tan B (b) tan C

   (c) 0 (d) 1

2. In Euclid Division Lemma, when $x = yq + r$, where x and y are positive integers which one is correct.

   (a) $0 \leq r < y$ (b) $0 \leq r < y$

   (c) $0 < r < y$ (d) $0 \leq r \leq y$

3. If the mean of 2, 4, 6, 8, 10, x, 14, 16 is 9 then the value of x is

(a) 10 (b) 11

(c) 12 (d) 13

4. Graph of $y = ax^2 + bx + c$ intersects x-axis at 2 distinct points if

(a) $b^2 - 4ac = 0$ (b) $b^2 - 4ac > 0$

(c) $b^2 - 4ac < 0$ (d) $b^2 - 4ac \geq 0$

5. If $5 \tan \theta - 4 = 0$ then the value of $\frac{5 \sin \theta - 4 \cos \theta}{5 \sin \theta + 4 \cos \theta}$ is

(a) $\frac{5}{3}$ (b) $\frac{5}{6}$

(c) 0 (d) $\frac{1}{6}$

6. The modal class of the following distribution is

Class Interval :	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Frequency :	3	5	8	10	9	4	3

(a) 70–80 (b) 40–50

(c) 50–60 (d) 30–40

7. If product of the zeroes is 5 and sum of the zeroes is –2 then the quadratic polynomial will be–

(a) $x^2 - 5x - 2$ (b) $x^2 + 5x - 2$

(c) $x^2 + 2x - 5$ (d) $x^2 + 2x + 5$

8. The relationship in mean, median and mode is

(a) Mode = 2 median – 3 mean

(b) Mode = 2 median - mean

(c) Mode = 3 median + 2 mean

(d) Mode = 3 median – 2 mean

9. The coordinates of the point where *y*-axis and the line represented by $\frac{x}{2} + \frac{y}{3} = 1$ intersect are :

(a) (0, 2) (b) (2, 0)

(c) (0, 3) (d) (3, 0)

10. If $x = \tan 2° \cdot \tan 36° \cdot \tan 54° \cdot \tan 88°$ then the value of x is _____

(a) 45° (b) 1

(c) 2 (d) 90°

SECTION B

Question number 11 to 18 are of 2 marks each

11. Find HCF and LCM of 90 and 144 by prime factorisation method.

12. Find the mean of the following distribution :

x :	12	16	20	24	28	32
f :	5	7	8	5	3	2

13. In ΔABC, D is the mid point of the side AB and $DE \parallel BC$ meets AC at E. Prove that $AE = \frac{1}{2} AC$.

OR

If $\Delta ABC \sim \Delta DEF$, $BC = 5$ cm, $EF = 4$ cm and $ar(\Delta ABC) = 75$ cm^2. Find the area of ΔDEF.

14. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - px + q$, then find the value of $\frac{1}{\alpha^3} + \frac{1}{\beta^3}$.

15. Draw 'less than ogive' for the following distribution :

Class Interval :	0–10	10–20	20–30	30–40	40–50	50–60
Frequency :	5	8	12	10	7	4

16. Without using trigonometric tables, evaluate

$$3\left(\frac{\sin 54}{\cos 36}\right)^2 + 2 \tan 14° \tan 30° \tan 76°.$$

17. For what value of p, the pair of linear equations

$$y - 2x - 5 = 0$$

$$px = 2y \text{ has unique solution.}$$

18. If $\tan\theta + \frac{1}{\tan\theta} = 2$, find the value of $\tan^2\theta + \frac{1}{\tan^2\theta}$.

SECTION C

Question number 19 to 28 carry 3 marks each

19. Draw the graph of $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and x-axis, shade the triangular region.

20. Prove that $\frac{1}{5 - 2\sqrt{3}}$ is irrational.

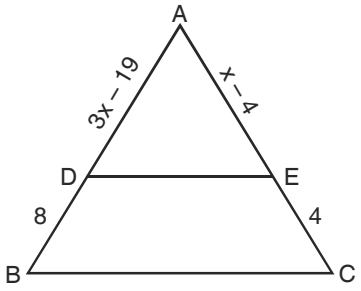
OR

Prove $\sqrt{5} - \sqrt{2}$ that is irrational.

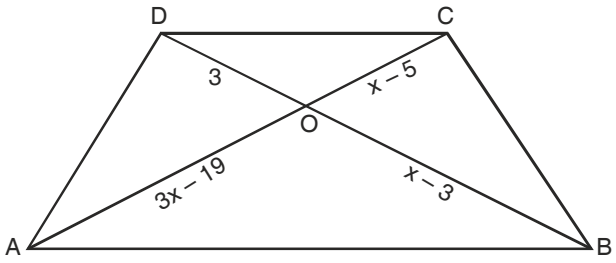
21. In $\triangle ABC$, $\angle C = 90°$ points P and Q lies on sides CA and CB respectively prove that

$$AQ^2 + BP^2 = AB^2 + PQ^2$$

22. In figure, find x if $DE \parallel BC$



OR



In the figure $ABCD$ is a trapezium. Find the value of x.

23. Solve for x and y : $\frac{1}{2(2x + 3y)} + \frac{3}{7(3x - 2y)} = \frac{1}{2}$

$$\frac{7}{2x + 3y} + \frac{4}{3x - 2y} = 2,$$

where $2x + 3y \neq 0$, $3x - 2y \neq 0$

24. Find the other two factors of $2x^4 - 3x^3 - 3x^2 + 6x - 2$ if two of its factors are $\left(x - \sqrt{2}\right)$ and $\left(x + \sqrt{2}\right)$.

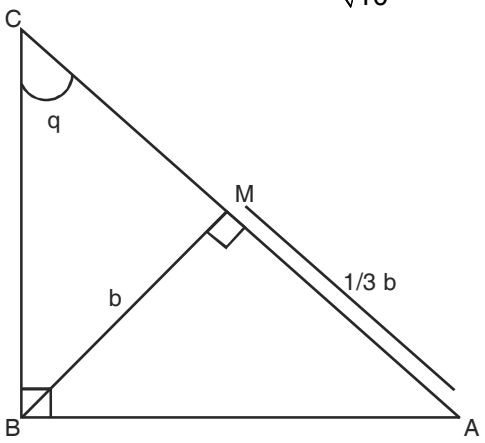
25. Prove the following identity

$$\frac{\cot A + \text{cosec } A - 1}{\cot A - \text{cosec } A + 1} = \frac{1 + \cos A}{\sin A}$$

OR

Prove this $2\sec^2\theta - \sec^4\theta - 2\ \text{cosec}^2\theta + \text{cosec}^4\theta = \cot^4\theta - \tan^4\theta$.

26. In the adjoining fig, prove that $\sin\theta = \frac{1}{\sqrt{10}}$



27. Find Geometrically the value of sin 30°.

28. Sides *AB* and *AC* and median *AD* of a ΔABC are respectively proportional to sides *PQ* and *PR* and median *PM* of another ΔPQR. Show that $\Delta ABC \sim \Delta PQR$.

SECTION D

Question number 29 to 34 carry 4 marks each

29. Show that the square of any positive integer is of the form $5q$, $5q + 1$, $5q + 4$ for some positive integer q.

30. In a three digit number, the digit at the hundred's place is three times the digit at one's place. The sum of the digits is 15. If the digits are reversed the number is reduced by 396. Find the original number.

OR

A family of 4 members is travelling in railways 3 tier coach another family of 3 members is travelling in 2 tier coach. The combined fare of both the families is Rs. 5100. If first family had 1 member less and the second had 1 member more, the total fare would have been Rs. 300 more. What will be the fare for a complex in railways 2-tier coach for the same journey.

31. ΔABC is an acute angled triangle. If tan $(A + B - C) = 1$ and sec $(B + C - A) = 2$ find $\angle$A, $\angle$B, and $\angle$C.

32. If the median of the following distribution is 28.5, than find the values of x and y.

Class Interval :	0–10	10–20	20–30	30–40	40–50	50–60	Total
Frequency :	5	x	20	15	y	5	60

33. Compute the value of mode for the following frequency distribution

Class Interval :	100–110	110–120	120–130	130–140	140–150	150–160	160–170
Frequency :	4	6	20	32	33	8	60

34. State and prove basic proportionality theorem.

ANSWERS

1. *d*
2. *a*
3. *c*
4. *b*
5. *c*
6. *b*
7. *d*
8. *d*
9. *c*
10. *b*
11. HCL = 18, $\angle$CM = 720
12. 20
13. 48 cm^2
14. $\frac{3abc - b^3}{a^3}$
15. $3 + \frac{2}{\sqrt{3}}$
17. $p \neq 4$
18. 2
19. Triangular pts., (2, 3), (–1, 0), (4, 0)
22. $x = 11,\ x = 8\sqrt{x} = 9$
23. $x = 2,\ y = 1$

24. $(2x - 1)\ (x - 1)$ 26. –

30. 672 **OR** [Rs. 800, Rs. 900] Rs. 1800

31. $\angle A = 60°$, $\angle B = 52.5°$, $\angle C = 67.5°$

32. $x = 8$, $y = 7$ 33. 140.9

34. –