

MATHSTIMES MODEL EXAMINATION-3

SSLC - MATHEMATICS

TIME : 2 ½ Hours

Maximum Marks : 100

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of Fairness, inform the Hall Supervisor immediately.

(2) Use Black or Blue ink to write and Pencil to draw diagrams.

Note : This question paper contains four sections.

SECTION – I

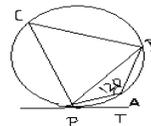
MARKS : 15

Note: (i) Answer all the 15 questions

15 x 1 = 15

(ii) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer.

- If $f : A \rightarrow B$ is a bijective function and if $n(A) = 5$, then $n(B)$ is equal to
a) 10 b) 4 c) 5 d) 25
- If a_1, a_2, a_3, \dots are in A.P such that $a_4/a_7 = 3/2$, then 13th term of the A.P is
a) $3/2$ b) 0 c) $12a$ d) $14a$
- The common ratio of the G.P a^{m-n}, a^m, a^{m+n} is
a) a^m b) a^{-m} c) a^n d) a^{-n}
- On dividing $\frac{x^2-25}{x+3}$ by $\frac{x+5}{x^2-9}$ is equal to
a) $(x-5)(x-3)$ b) $(x-5)(x+3)$ c) $(x+5)(x-3)$ d) $(x+5)(x+3)$
- The sum of two zero's of the polynomial $f(x) = 2x^2 + (p+3)x + 5$ is zero then the value of p is
a) 3 b) 4 c) -3 d) -4
- Matrix $A = [a_{ij}]_{m \times n}$ is a square matrix if
a) $m < n$ b) $m > n$ c) $m = 1$ d) $m = n$
- The Centre of a circle is $(-6, 4)$. If one end of the diameter of the circle is at $(-12, 8)$, then the other end is at _____
a) $(-18, 12)$ b) $(-9, 6)$ c) $(-3, 2)$ d) $(0, 0)$
- If the points $(2, 5)$, $(4, 6)$ and (a, a) are collinear then the value of a is _____
a) -8 b) 4 c) -4 d) 8
- In the figure, if $\angle PAB = 120^\circ$ then $\angle BPT =$
a) 120° b) 80° c) 50° d) 60°



10. The perimeter of two similar triangles ΔABC and ΔDEF are 36 cm and 24cm respectively. If $DE = 10\text{cm}$, then AB is
 a) 12 cm b) 20cm c) 15 cm d) 18 cm
11. $(1-\cos^2\theta)(1+\cot^2\theta)=$
 (a) $\sin^2\theta$ (b) 0 (c) 1 (d) $\tan^2\theta$
12. $(1+\tan^2\theta)(1-\sin\theta)(1+\sin\theta) =$
 (a) $\cos^2\theta - \sin^2\theta$ (b) $\sin^2\theta - \cos^2\theta$ (c) $\sin^2\theta + \cos^2\theta$ (d) 0
13. The surface areas of two spheres are in the ratio of 9:25. Then their volumes are in the ratio.
 a) 81 : 625 b) 729 : 15625 c) 27 : 75 d) 27 : 125
14. Standard deviation of a collection of data is $2\sqrt{2}$. If each value is multiplied by 3 then the standard deviation of the new data is
 a) $\sqrt{12}$ b) $4\sqrt{2}$ c) $6\sqrt{2}$ d) $9\sqrt{2}$
15. If A and B are two events such that $P(A) = 0.25$, $P(B) = 0.05$ and $P(A \cap B) = 0.14$, then $P(A \cup B) =$
 a) 0.61 b) 0.16 c) 0.14 d) 0.6

SECTION – II

MARKS : 20

Note: (i) Answer 10 questions

10 x 2 = 20

(ii) Question number 30 is compulsory. Select any 9 questions from the first 14 questions.

16. If $A \subset B$, then find $A \cap B$ and $A \setminus B$ (Use Venn Diagram)
17. Let $U = \{4,8,12,16,20,24,28\}$, $A = \{8,16,24\}$ and $B = \{4,16,20,28\}$ Find $(A \cup B)'$ and $(A \cap B)'$
18. Prove that $x - 1$ is a factor of $x^3 - 6x^2 + 11x - 6$.
19. Find the square root of $x^4 + \frac{1}{x^4} + 2$
20. If $A = \begin{pmatrix} 2 & 3 \\ -9 & 5 \end{pmatrix} - \begin{pmatrix} 1 & 5 \\ 7 & -1 \end{pmatrix}$ Then find the additive inverse of A
21. Solve: $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 - 2x \\ 31 + 4y \end{bmatrix}$.
22. If the st. line passing through the points (h,3) and (4,1) intersects the line $7x - 9y - 19 = 0$ at right angle, then find the value of h.
23. Find the equation of the straight lines parallel to the co-ordinate axes and passing through the point (-5,-2).
24. Let PQ be a tangent to a circle at A and AB be a chord. Let C be a point on the circle such that $\angle BAC = 54^\circ$ and $\angle BAQ = 62^\circ$. Find $\angle ABC$.

25. A kite is flying with a string of length 200 m. If the thread makes an angle 30° with the ground, find the distance of the kite from the ground level. (Here, assume that the string is along a straight line)
26. A solid right circular cylinder has radius of 14 cm and height of 8 cm. Find its curved surface area and total surface area.
27. The internal and external radii of a hollow cylinder are 12 cm and 18 cm respectively. Its height is 14 cm. Find its curved surface area.
28. If $n=10$, $\bar{x} = 12$ and $\sum x^2=1530$, then calculate the coefficient of variation.
29. 20 cards are numbered from 1 to 20. One card is drawn at random. What is the probability that the number on the card is (i) a multiple of 4 (ii) not a multiple of 4.
30. Find the first six terms of the sequence given by $f_1 = f_2 = 1$ and $f_n = f_{n-1} + f_{n-2}$, $n = 3,4,\dots$

(OR)

Prove the identity $\frac{\sin\theta}{1-\cos\theta} = \operatorname{cosec}\theta + \cot\theta$.

SECTION -III

(MARKS : 45)

Note: (i) Answer 9 questions

9 x 5 = 45

(ii) Question number 45 is compulsory. Select any 8 questions from the 14 questions.

31. For $A = \{ x / -3 \leq x < 4, x \in \mathbb{R} \}$, $B = \{ x / x < 5, x \in \mathbb{N} \}$ and $C = \{-5, -3, -1, 0, 1, 3\}$, Show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
32. In a group of students, 65 play foot ball, 45 play hockey, 42 play cricket, 20 play foot ball and hockey, 25 play foot ball and cricket, 15 play hockey and cricket and 8 play all the three games. Find the number of students in the group. (Assume that each student in the group plays atleast one game)
33. An amount Rs.500 is deposited in a bank which pays annual interest at the rate of 10% compounded annually. What will be the value of this deposit at the end of 10th year?
34. Factorize $x^3 - 5x^2 - 2x + 24$
35. Find the values of m, n the polynomial of perfect square root are $m - nx + 28x^2 + 12x^3 + 9x^4$.
36. If $A = \begin{pmatrix} 1 & -4 \\ -2 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 6 \\ 3 & -2 \end{pmatrix}$ then prove that $(A+B)^2 \neq A^2 + 2AB + B^2$
37. Find the points of Trisection of the line segment joining the points A(2,-2) and B(-7,4).
38. Find the equation of the straight line segment whose end points are the point of intersection of the straight lines $2x - 3y + 4 = 0$, $x - 2y + 3 = 0$ and the midpoint of the line joining the points (3, -2) and (-5, 8).

39. ABCD is a quadrilateral with $AB = AD$. If AE and AF are internal bisectors of $\angle BAC$ and $\angle DAC$ respectively, then prove that $EF \parallel BD$.
40. $\tan \theta = n \tan \alpha$ and $\sin \theta = m \sin \alpha$, then prove that $\cos^2 \theta = \frac{m^2 - 1}{n^2 - 1}$, $n \neq \pm 1$.
41. The radii of two circular ends of a frustum shaped bucket are 15 cm and 8 cm. If its depth is 63cm, find the capacity of the bucket in liters. (Take $\pi = \frac{22}{7}$).
42. A hollow cylindrical pipe is of length 40 cm. Its internal and external radii are 4 cm and 12 cm respectively. It is melted and cast into a solid cylinder of length 20 cm. Find the radius of the new solid.
43. The mean and the standard deviation of a group of 20 items was found to be 40 and 15 respectively. While checking it was found that an item 43 was wrongly written as 53. Calculate the correct mean and standard deviation.
44. Two dice are rolled and the product of the outcomes(numbers) are found. What is the probability that the product so found is a prime number?
45. If a^2, b^2, c^2 are in A.P. then show that $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are also in A.P.

(or)

Find the L.C.M of $x^3 + y^3, x^3 - y^3, x^4 + x^2 y^2 + y^4$

SECTION – IV

(MARKS : 20)

Note: Answer both the questions choosing either of the alternatives. 10 x 2 = 20

46. Draw a circle of radius 3cm. From an external point 7cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

(or)

Construct a cyclic quadrilateral ABCD where $AB = 6\text{cm}$, $AD = 4.8\text{cm}$, $BD = 8\text{cm}$, $CD = 5.5\text{cm}$.

47. Draw the graph of $y = x^2 + 3x + 2$ and use it to solve the equation $x^2 + 2x + 4 = 0$

(or)

Draw the Graph of $xy = 20$, $x, y > 0$. Use the graph to find y when $x = 5$, and to find x when $y = 10$.