

MATHSTIMES MODEL EXAMINATION-1

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 $n [p(A)] = 64$ then $n(A)$ is
a)6 b) 8 c) 4 d) 5
- If a, b, c, l, m are in A.P, then the value of $a - 4b+6c -4l +m$ is
a)1 b) 2 c) 3 d) 0
- If a, b, c are in A.P, then $(a-b)/(b-c)$ is equal to
a) a/b b) b/c c) a/c d) 1
- The GCD of (x^3+1) and $x^4 -1$ is
a) x^3-1 b) x^3-1 c) $x + 1$ d) $x - 1$
- The LCM of a^k, a^{k+3}, a^{k+5} where $K \in \mathbb{N}$ is
a) a^{k+9} b) a^k c) a^{k+6} d) a^{k+5}
- If A is of order 3×4 and B is of order 4×3 , then the order of BA is
a) 3×3 b) 4×4 c) 4×3 d) Not defined
- If $(1,2), (4,6), (x,6), (3,2)$ are the vertices of a parallelogram taken in order then the value of x is _____
a) 6 b) 2 c) 1 d) 3

8. The angle of inclination of a st. line parallel to x-axis is equal to _____
a) 0° b) 60° c) 45° d) 90°
9. If a vertical stick 12m long casts a shadow 8m long on the ground and at the same time a tower casts a shadow 40 m long on the ground then the height of the tower is
a) 40 m b) 50m c) $75\overline{m}$ d) 60m
10. The sides of two similar triangles are in the ratio 2 : 3, then their areas are in the ratio
a) 9 : 4 b) 4 : 9 c) 2 :3 d) 3 :2
11. $(1-\sin^2\theta)\sec^2\theta=$
(a) 0 (b) 1 (c) $\tan^2\theta$ (d) $\cos^2\theta$
12. If $\tan\theta=\frac{a}{x}$, then the value of $\frac{x}{\sqrt{a^2+x^2}}=$
(a) $\cos\theta$ (b) $\sin\theta$ (c) $\operatorname{cosec}\theta$ (d) $\sec\theta$
13. If the total surface area a solid right circular cylinder is $200\pi\text{ cm}^2$ and its radius is 5cm, then the sum of its height and radius is
a) 20cm b) 25cm c) 30cm d)15cm
14. For a collection of 11 items, $\Sigma x = 132$, then the arithmetic mean is
a) 11 b) 12 c) 14 d) 13
15. The outcome of random experiment results in either success or failure. If the probability of success is twice the probability of failure, then the probability of success is
a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) 1 d)0

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. Verify the commutative property of set intersection for $A= \{1,m,n,o,2,3,4,7\}$
 $B= \{ 2,5,3,-2,m,n,o,p\}$
17. Let $A = \{1,2,3,4\}$ and $B = \{-1,2,3,4,5,6,7,8,10,11,12\}$. Let $R=\{(1,3), (2,6), (3,10), (4,9)\} \subseteq A \times B$ be a relation. Show that R is a function and find its domain, co domain and the range of R.

18. The fifth term of a G.P. is 1875. If the first term is 3, Find the Common ratio.
19. Solve : $3x - 5y = -16$ $2x + 5y = 31$
20. Simplify $\frac{x^3}{x-2} + \frac{8}{2-x}$.
21. If $A = \begin{pmatrix} 8 & 5 & 2 \\ 1 & -3 & 4 \end{pmatrix}$ Find A^T and $(A^T)^T$::
22. 7. If $\begin{pmatrix} 2x + y \\ x - 3y \end{pmatrix} = \begin{pmatrix} 5 \\ 13 \end{pmatrix}$ Then find the values of x and y
23. In what ratio does the point P (-2,3) divide the line segment joining the points A(-3,5) and B(4,-9) internally?
24. Find the x and y intercepts of the straight line $3x+10y+ 4 = 0$.
25. Prove the identity $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = \operatorname{cosec} \theta - \cot\theta$.
26. A ladder leaning against a vertical wall, makes an angle of 60° with the ground. The foot of the ladder is 3.5 m away from the wall. Find the length of the ladder.
27. A mansion has 12 right cylindrical pillars each having radius 50 cm and height 3.5 m. Find the cost to paint the lateral surface of the pillars at Rs.20 per square metre.
28. If the coefficient of variation of a collection of data is 57 and its S.D is 6.84, then find the mean.
29. A box contains 10 white, 6 red and 10 black balls. A ball is drawn at random. Find the probability that the ball drawn is white or red.
30. Define Tangent – Chord theorem.

(OR)

A sector containing an angle of 120° is cut off from a circle of radius 21 cm and folded into a cone. Find the curved surface area of the cone. (Take $\pi = 22/7$)

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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. Prove by Venn Diagram that $A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$.

32. 2. A function $f : [-3,7) \rightarrow \mathbb{R}$ is defined as follows

$$a. f(x) = \begin{cases} 4x^2 - 1 & : -3 \leq x < 2 \\ 3x - 2 & : 2 \leq x \leq 4 \\ 2x - 3 & : 4 < x < 7 \end{cases}$$

b. Find (i) $f(5) + f(6)$ (ii) $f(1) - f(-3)$ (iii) $f(-2) - f(4)$ (iv) $\frac{f(3)+f(-1)}{2f(6)-f(1)}$

33. Find the sum of all 3 digit natural numbers, which are divisible by 9.

34. Find the square root of $4x^4 + 8x^3 + 8x^2 + 4x + 1$

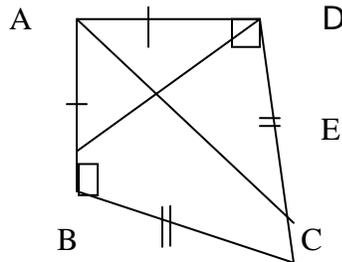
35. 7.A car left 30 minutes later than the scheduled time. In order to reach its destination 150km away in time, it has to increase its speed by 25 km/hr from its usual speed, find its usual speed.

36. If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$. Then Verify that $A^2 - 4A + 5I_2 = 0$

37. Find the area of the Quadrilateral formed by the points $(-4, 5)$, $(0, 7)$, $(5, -5)$ and $(-4, -2)$

38. If the vertices of a ΔABC are $A(2, -4)$, $B(3, 3)$ and $C(-1, 5)$. Find the equation of the straight line along the altitude from the vertex B.

39. A boy is designing a diamond shaped kite, as shown in the figure where $AE = 16$ cm, $EC = 81$ cm. He wants to use a straight cross bar BD . How long should it be?



40. A student sitting in a classroom sees a picture on the black board at a height of 1.5 m from the horizontal level of sight. The angle of elevation of the picture is 30° . As the picture is not clear to him, he moves straight towards the black board and sees the picture at an angle of elevation of 45° . Find the distance moved by the student.

41. A circus tent is to be erected in the form of a cone surmounted on a cylinder. The total height of the tent is 49 m. Diameter of the base is 42 m and height of the cylinder is 21 m. Find the cost of canvas needed to make the tent, if the cost of canvas is Rs.12.50/m². (Take $\pi = 22/7$).

42. A cylindrical shaped well of depth 20 m and diameter 14 m is dug. The dug out soil is evenly spread to form a cuboid–platform with base dimension 20 m x 14 m. Find the height of the platform.
43. Mean of 100 items is 48 and their standard deviation is 10. Find the sum of all the items and the sum of the squares of all the items.
44. Let A, B, C be any three mutually exclusive and exhaustive events such that $P(B) = \frac{3}{2}P(A)$ and $P(C) = \frac{1}{2}P(B)$. Find $P(A)$.
45. If S_1 , S_2 and S_3 are the sum of first n, 2n and 3n terms of a geometric series respectively, then prove that $S_1(S_3 - S_2) = (S_2 - S_1)^2$.

(OR)

Three chairs and two tables cost Rs.700 and five chairs and three tables cost Rs.1100. What is the total cost of 2 chairs and 3 tables? WWW.MATHSTIMES.COM

SECTION – IV

(MARKS : 20)

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

46. Draw a circle of diameter 10 cm. From a point P, 13cm away from its centre, draw the two tangents PA and PB to the circle, and measure their lengths.

(or)

Construct a ΔABC in which $BC = 5.5\text{cm}$, $\angle A = 60^\circ$ and the median AM from the vertex A is 4.5 cm.

47. Draw the graph of $y = x^2 + 2x - 3$ and hence find the roots of $x^2 - x - 6 = 0$

(or)

Draw a graph for the following table and identify the variation

X	2	3	5	8	10
Y	8	12	20	32	40

Hence, find the value of y when $x = 4$.