MATHSTIMES MODEL EXAMINATION -2

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.

1. If n(A) = 20, n(B) = 30 and n(AUB) = 40, then n(AnB) is equal to

   a)50 b) 10 c) 40 d) 70

2. If k+2, 4k-6, 3k-2 are the three consecutive terms of an A.P, then the value of k is

   a) 2 b) 3 c) 4 d) 5

3. If the nth term of an A.P is tn = 3 -5n, then the sum of the first n terms is

   a) n/2[1-5n] b) n(1-5n) c) n/2[1+5n] d) n/2[1+n]

4. If the system 6x – 2y = 3, kx – y = 2 has a unique solution, then

   a) k = 3 b) k≠3 c) k = 4 d) k≠4

5. The remainder when $x^2 - 2x + 7$ is divided by x+4 is

   a) 28 b) 29 c) 30 d) 31

6. If a matrix is of order 2 x 3, then the number of elements in the matrix is

   a)5 b) 6 c) 2 d) 3

7. The value of k if the st.lines 3x + 6y + 7 = 0 and 2x + ky = 5 are perpendicular is

   a) 1 b) -1 c) 2 d) 1/2

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 straight line intersects the sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, then AE/AC=

   a) AD/DB b) AD/AB c) DE/BC d) AD/EC

10. AB and CD are two chords of a circle which when produced to meet at a point P such that AB = 5 cm, AP = 8 cm and CD = 2cm then PD =

    a) 12 cm b) 5 cm c) 6cm d) 4 cm

11. If x=a secθ, y=b tanθ, *then the value of* $\frac{x^2}{a^2} - \frac{y^2}{b^2}$ =

    (a) 1 (b) -1 (c) $\tan^2\theta$ (d) $\text{cosec}^2\theta$

12. $(1-\cos^2\theta)(1+\cot^2\theta)$=

    (a) $\sin^2\theta$ (b) 0 (c) 1 (d) $\tan^2\theta$

13. Base area of a right circular cylinder is 80 cm^2. If its height is 5cm, then the volume is equal to

    a) 400cm^3 b) 16 cm^3 c) 200 cm^3 d) $\frac{400}{3}$ cm^3

14. If the standard deviation of a set of data is 1.6, then the variance is

    a) 0.4 b) 2.56 c)1.96 d) 0.04

15. A bag contains 5 black balls, 4 white balls, 3 red balls. If a ball selected at random, the probability that it is not a red ball is

    a) $\frac{5}{12}$ b) $\frac{4}{12}$ c) $\frac{3}{12}$ d) $\frac{3}{4}$

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. Let A= {1,2,3,4,5} B = N f:A →B be defined by $f(x) = x^2$. Find the range of f. Identify the type of function.

17. If A and B are two sets and U is the universal set such that n(U) = 700, n(A) = 200, n(B) = 300 n(A∩B) = 100, find n(A'∩B ').

18. A man saves Rs.320 in the month of January, Rs.360 in the month of February, Rs.400 in the month of March. If he continues his savings in this sequence, What will be his savings in the month of November in the same year?

19. Frame the quadratic equation whose roots are $7 + \sqrt{3}$ and $7 - \sqrt{3}$
20. Find the L.C.M of $3(a-1)$, $2(a-1)^2$, (a^2-1)
21. Find the values of x, y and z if $\begin{pmatrix} x & 5 & 4 \\ 5 & 9 & 1 \end{pmatrix} = \begin{pmatrix} 3 & 5 & z \\ 5 & y & 1 \end{pmatrix}$
22. If the centroid of a triangle is at (3,3) and two of its vertices are A(1,4) and B(5,3). Then Find the third vertex of the triangle.
23. In ΔPQR, AB || QR. If AB is 3 cm, PB is 2cm and PR is 6 cm, then find the length of QR.
24. Prove that $Sin^6\theta + Cos^6\theta = 1 - 3Sin^2\theta Cos^2\theta$.
25. The angle of elevation of the top of a tower as seen by an observer is 30°. The observer is at a distance of $30\sqrt{3}$ m from the tower. If the eye level of the observer is 1.5m above the ground level, then find the height of the tower.
26. The thickness of a hemispherical bowl is 0.25 cm. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl. (Take $\pi = 22/7$)
27. The central angle and radius of a sector of a circular disc are 180° and 21 cm respectively. If the edges of the sector are joined together to make a hollow cone, then find the radius of the cone.
28. Find the standard Deviation of first 10 natural numbers.
29. A box contains 4 green, 5 blue and 3 red balls. A ball is drawn at random. Find the probability that the selected ball is (i) Red in colour (ii) not green in colour.
30. Construct a 2 X 2 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = 2i - j$

(OR)

If the x-intercept and y-intercept of a straight line are $\frac{2}{3}$ and $\frac{-1}{2}$ respectively, then find the equation of the straight line.

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. Let A= {0, 1, 2, 3} and B= {1, 3, 5, 7, 9} be two sets. Let f: A → B be a function given by f(x) = 2x +1. Represent this function as (i) a Set of ordered pairs (ii) a table (iii) an arrow diagram and (iv) a graph.
32. In a town 85% of people speak Tamil, 40% speak English and 20% speak Hindi. Also, 32% speak English and Tamil, 13% speak Tamil and Hindi and 10% speak English and Hindi, Find the percentage of people who can speak all the three languages.
33. The nth term of a sequence is defined by $t_n = pn^2 + qn+15$. If $t_2 = 13$ and $t_4 = 27$, Find p and q.
34. Find the sum to 'n' terms of the series 6 + 66 + 666 + ……
35. If the equation $(1 + m^2) x^2 + 2mcx + c^2 – a^2 = 0$ has equal roots, then prove that $c^2 = a^2 (1 + m^2)$.
36. If α and β are the roots of $5x^2 – px + 1 = 0$ and $\alpha - \beta = 1$ then find p.
37. 7. Factorize $x^3 – 5x^2 – 2x +24$
38. If $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$. Then Verify that $(AB)^T = B^T A^T$
39. The Vertices of ΔABC are A(2,1) , B(–2, 3) and C(4, 5). Find the equation of the median through the vertex A.
40. Find the equation of the perpendicular bisector of the straight line segment joining the points (3, 4) and (–1, 2).
41. A jet fighter at a height of 3000 m from the ground, passes directly over another jet fighter at an instance when their angles of elevation from the same observation point are 60° and 45° respectively. Find the distance of the first jet fighter from the second jet at that instant.
42. The perimeter of the ends of a frustum of a cone are 44 cm and 8.4 π cm. If the depth is 14 cm., then find its volume.
43. A solid sphere of diameter 6 cm is dropped into a right circular cylindrical vessel with diameter 12 cm, which is partly filled with water. If the sphere is completely submerged in water, how much does the water level in the cylindrical vessel increase?
44. Calculate the standard deviation of the following data.

x	3	8	13	18	23
f	7	10	15	10	8

45. State and prove the Thales theorem.

(OR)

A basket ball contains 20 apples and 10 oranges out of which 5 apples and 3 oranges are rotten. If a person takes outONE fruit at random, find the probability that the fruit is either an apple or a good fruit.

SECTION – IV

(MARKS : 20)

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

46. Construct a ΔPQR in which the base PQ = 6cm, $\angle R = 60°$ and the altitude from R to PQ is 4cm.

(or)

Construct a cyclic quadrilateral PQRS given PQ = 5cm, QR = 4cm, $\angle QPR=35°$ and $\angle PRS=70°$

47. Solve the equation $x^2-2x-3 = 0$ graphically.

(or)

The cost of the milk per litre is ` 15. Draw the graph for the relation between the quantity and cost. Hence find

i)The proportionality constant

ii) The cost of 3 litres of milk.