

--	--	--	--	--	--

SSLC MODEL EXAMINATION

MATHEMATICS

[English Version]

Time : 2½ Hrs.]

[Max. Marks : 100

SECTION - A

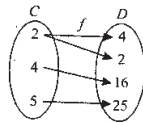
Note : (i) All questions are compulsory.

(ii) Each question carries one mark.

(iii) Choose the most suitable answer from the given four alternatives.

15 x 1 = 15

1. The given diagram represents



- a) an onto function b) a constant function c) an one-one function d) not a function

2. The next term of $\frac{1}{20}$ in the sequence $\frac{1}{2}, \frac{1}{6}, \frac{1}{12}, \frac{1}{20}, \dots$ is

- a) $\frac{1}{24}$ b) $\frac{1}{22}$ c) $\frac{1}{30}$ d) $\frac{1}{18}$

3. If the product of the first four consecutive terms of a G.P. is 256 and if the common ratio is 4 and the first term is positive, then its 3rd term is

- a) 8 b) $\frac{1}{16}$ c) $\frac{1}{32}$ d) 16

4. The quotient when $x^3 - 5x^2 + 7x - 4$ is divided by $x - 1$ is

- a) $x^2 + 4x + 3$ b) $x^2 - 4x + 3$ c) $x^2 - 4x - 3$ d) $x^2 + 4x - 3$

5. A quadratic equation whose one root is 3, is

- a) $x^2 - 6x - 5 = 0$ b) $x^2 + 6x - 5 = 0$ c) $x^2 - 5x - 6 = 0$ d) $x^2 - 5x + 6 = 0$

6. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$, $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$, then the values of x and y respectively, are

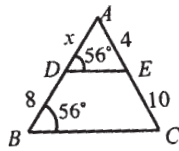
- a) 2, 0 b) 0, 2 c) 0, -2 d) 1, 1

7. If $(1, 2)$, $(4, 6)$, $(x, 6)$ and $(3, 2)$ are the vertices of a parallelogram taken in order, then the value of x is

- a) 6 b) 2 c) 1 d) 3

8. If a straight line $y = 2x + k$ passes through the point $(1, 2)$, then the value of k is equal to

- a) 0 b) 4 c) 5 d) -3



9. In the figure, the value x is equal to
- a) 4 . 2 b) 3 . 2 c) 0 . 8 d) 0 . 4
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 $CD = 2$ cm the $PD =$
- a) 12 cm b) 5 cm c) 6 cm d) 4 cm
11. $(1 - \cos^2\theta) (1 + \cot^2\theta) =$
- a) $\sin^2\theta$ b) 0 c) 1 d) $\tan^2\theta$
12. A man is 28.5 m away from a tower. His eye level above the ground is 1.5 m. The angle of elevation of the tower from his eyes is 45° . Then the height of the tower is
- a) 30 m b) 27.5 m c) 28.5 m d) 27 m
13. If the volume of a sphere is $\frac{9}{16} \pi$ cu.cm., then its radius is
- a) $\frac{4}{3}$ cm b) $\frac{3}{4}$ cm c) $\frac{3}{2}$ cm d) $\frac{2}{3}$ cm
14. If the variance of a data is 12.25, then the S.D. is
- a) 3.5 b) 3 c) 2.5 d) 3.25
15. Two dice are thrown simultaneously. The probability of getting a doublet is
- a) $\frac{1}{36}$ b) $\frac{1}{3}$ c) $\frac{1}{6}$ d) $\frac{2}{3}$

SECTION - B

Note : (i) Answer any **10** questions from questions numbered 16 to 30

(ii) Question No. **30** is compulsory

(iii) Each question carries two marks.

10 x 2 = 20

16. Let $A = \{a, b, c, d\}$, $B = \{a, c, e\}$ and $C = \{a, e\}$ Show that $A \cap (B \cap C) = (A \cap B) \cap C$.
17. $A = \{-2, -1, 1, 2\}$ and $f = \{(x, \frac{1}{x}) : x \in A\}$. Write down the range of f . Is f a function from A to A ?
18. Find the sum of the series : $2 + 4 + 6 + \dots + 100$
19. Multiply : $\frac{x^2 - 2x}{x + 2} \times \frac{3x + 6}{x - 2}$
20. Find the square root of : $(x + 1)^6 + \frac{1}{(x + 1)^6} + 2$

21. If $A = \begin{bmatrix} 8 & 5 & 2 \\ 1 & -3 & 4 \end{bmatrix}$, then find A^T and $(A^T)^T$
22. Find the values of x , y and z from the matrix equation
- $$\begin{pmatrix} 5x+2 & y-4 \\ 0 & 4z+6 \end{pmatrix} = \begin{pmatrix} 12 & -8 \\ 0 & 2 \end{pmatrix}$$
23. Find the equation of straight line whose angle of inclination is 45° and y -intercept is $\frac{2}{5}$
24. Show that the straight lines $x + 2y + 1 = 0$ and $3x + 6y + 2 = 0$ are parallel.
25. AB and CD are two chords of a circle which intersect each other externally at P , if $AB = 4$ cm, $BP = 5$ cm and $PD = 3$ cm, then find CD .
26. Prove that $\frac{1 + \sec \theta}{\sec \theta} = \frac{\sin^2 \theta}{1 - \cos \theta}$
27. A girl of height 150 cm stands in front of a lamp-post and casts a shadow of length $150\sqrt{3}$ cm on the ground. Find the angle of elevation of the top of the lamp-post.
28. Total surface area of a solid hemisphere is 675π sq.cm. Find the curved surface area of the solid hemisphere.
29. A die is thrown twice. Find the probability of getting a total of 9.
30. The largest value in a collection of data is 7.44. If the range is 2.26, then find the smallest value in the collection.

(OR)

The circumference of the base of a 12 cm high wooden solid cone is 44 cm. Find the volume.

SECTION - C

- Note :** (i) **9** questions to be answered from the questions numbered 31 to 45 **9 x 5 = 45**
 (ii) Each question carries FIVE marks.
 (iii) Answer any **8** questions from the first 14 questions
 (iv) Question no **45** is compulsory.

31. Using Venn diagram, verify : $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
32. Let $A = \{5, 6, 7, 8\}$; $B = \{-11, 4, 7, -10, -7, -9, -13\}$ and $f = \{(x, y) : y = 3 - 2x, x \in A, y \in B\}$
 (i) write down the elements of f . (ii) What is the co-domain?
 (iii) What is the range? (iv) Identify the type of function
33. Find the sum to n terms of the series $0.4 + 0.94 + 0.994 + \dots$
34. Factorize : $x^3 - 10x^2 - x + 10$

35. Find the square root of $x^4 - 10x^3 + 37x^2 - 60x + 36$.
36. If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, then prove that $c^2 = a^2(1 + m^2)$
37. If $A = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} -2 & 5 \\ 6 & 7 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 1 \\ -5 & 3 \end{pmatrix}$ Verify that $A(B+C) = AB + AC$
38. Find the area of the quadrilateral whose vertices are: $(-3, 4)$, $(-5, -6)$, $(4, -1)$ and $(1, 2)$
39. Find the equations of the straight lines each passing through the point $(6, -2)$ and whose sum of the intercepts is 5.
40. State and prove Pythagoras theorem.
41. If $\tan\theta = n \tan \alpha$ and $\sin\theta = m \sin \alpha$, then prove that $\cos^2 \theta = \frac{m^2 - 1}{n^2 - 1}$, $n \neq \pm 1$
42. A solid metallic cylinder of diameter 4cm and height 45cm is melted and recast into identical spherical shots of radius 3cm each. Find the number of spherical shots.
43. Find the standard deviation of the numbers 62, 58, 53, 50, 63, 52, 55.
44. The probability that A, B and C can solve a problem are $\frac{4}{5}$, $\frac{2}{3}$ and $\frac{3}{7}$ respectively. The probability of the problem being solved by A and B is $\frac{8}{15}$, B and C is $\frac{2}{7}$, A and C is $\frac{12}{35}$. The probability of the problem being solved by all the three is $\frac{8}{35}$. Find the probability that the problem can be solved by atleast one of them
45. (a) Find the sum of the series : $5^2 + 7^2 + 9^2 + \dots + 39^2$

(OR)

- (b) The total surface area of a solid right circular cylinder is 231 cm^2 . Its curved surface area is two thirds of the total surface area. Find the radius and height of the cylinder.

SECTION - D

Note : (i) Each question carries TEN marks

(ii) Answer both the questions

2 x 10 = 20

46. (a) Draw a circle of radius 3 cm. From an external point 7 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
- (OR)
- (b) Construct a cyclic quadrilateral PQRS given $PQ = 5\text{cm}$, $QR = 4\text{cm}$, $\angle QPR = 35^\circ$ and $\angle PRS = 70^\circ$.
47. (a) Draw the graph of $y = x^2 + 2x - 3$ and hence find the roots of $x^2 - x - 6 = 0$.

(OR)

- (b) A bus travels at a speed of 40 km / hr. Write the distance - time formula and draw the graph of it. Hence, find the distance travelled in 3 hours.