

SSLC MATHS SPECIAL QUESTION-2016

MARKS :100

SECTION - A

I. Choose the correct answer:-

15 x 1 = 15

1. Given $f(x) = (-1)^x$ is a function from N to Z . Then the range of f is
a) $\{1\}$ b) N c) $\{1, -1\}$ d) Z
2. The next term of in the sequence
(a) $\frac{1}{24}$ (b) $\frac{1}{22}$ (c) $\frac{1}{30}$ (d) $\frac{1}{30}$
3. When $x=2$ the value of $1+x+x^2+\dots+x^9$ is
a) 511 b) 1023 c) 513 d) 1025
4. The sum of two zeros of the polynomial is $f(x) = 2x^2 + (p+3)x + 5$ zero, then the value of p is
a) 3 b) 4 c) -3 d) -4
5. If $\frac{1}{\alpha}$ is a root of the equation $2x^2 - 5x + 7 = 0$, then the value of $7\alpha^2 - 5\alpha$ is
a) 2 b) -2 c) 5 d) -5
6. $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$, then the values of a, b, c and d respectively are
a) -1, 0, 0, -1 b) 1, 0, 0, 1 c) -1, 0, 1, 0 d) 1, 0, 0, 0
7. The centre of a circle is at $(3,4)$. If the circle touches the x -axis, then the radius of the Circle is
a) 3 b) 4 c) 5 d) 7
8. The equation of the straight line passing through the origin and perpendicular to the straight line $2x + 3y - 7 = 0$ is
a) $2x + 3y = 0$ b) $3x - 2y = 0$ c) $y + 5 = 0$ d) $y - 5 = 0$
9. If $\Delta ABC \sim \Delta PQR$ and $\text{area}(\Delta PQR) = 4$ $\text{area}(\Delta ABC) = 1$, then $AB:PQ$ is
a) 2 : 1 b) 4 : 1 c) 1 : 2 d) 1 : 4
10. If the tangents PA and PB from an external point P to circle with centre O are inclined to each other at an angle of 40° then $\angle POA =$
a) 70° b) 80° c) 50° d) 60°
11. $\cos^4 x - \sin^4 x =$
a) $2\sin^2 x - 1$ b) $2\cos^2 x - 1$ c) $1 + 2\sin^2 x$ d) $1 - 2\cos^2 x$
12. $\cos(90^\circ - \theta)\cos \theta - \sin(90^\circ - \theta)\sin \theta =$
a) $\sin 90^\circ$ b) $\cot 45^\circ$ c) $\operatorname{cosec} 45^\circ$ d) $\cos 90^\circ$
13. If the radius of a sphere is 2 cm, then the curved surface area of the sphere is equal to
a) $8\pi \text{ cm}^2$ b) $16\pi \text{ cm}^2$ c) $12\pi \text{ cm}^2$ d) $16\pi \text{ cm}^2$

14. If t is the S.D of x, y, z , of then the S.D of $x + 5, y + 5, z + 5$ is

- a) $\frac{t}{3}$ b) $t + 5$ c) t d) $x y z$

15. Probability of getting neither 3 heads nor 3 tails in tossing a coin 3 times is

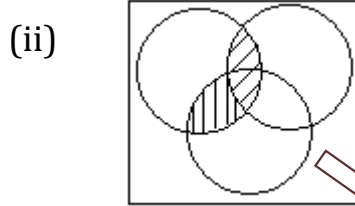
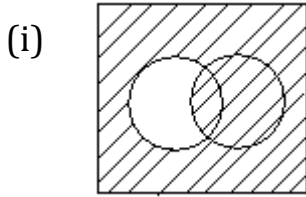
- (a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{1}{2}$

SECTION - B

II. Answer any ten questions: (Q.No.30 is compulsory)

10 x 2 = 20

16. Write a description of each shaded area.



17. Let $(x) = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0, \text{ where } x \in \mathbb{R} \end{cases}$

Does the relation $\{(x, y) | y = |x|, x \in \mathbb{R}\}$ define a function? Find its range.

18. Find the sum of $31 + 33 + \dots + 53$.

19. Find a quadratic polynomial each with the given numbers as the sum and product of its zeros $-\frac{1}{3}, 1$

20. Solve : $3x - \frac{8}{x} = 2$

21. Find the values of x, y and z $\begin{bmatrix} 5x+2 & y-4 \\ 0 & 4z+6 \end{bmatrix} = \begin{bmatrix} 12 & -8 \\ 0 & 2 \end{bmatrix}$

22. Construct a 2×3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = |2i - 3j|$.

23. Find the angle of inclination of the straight line $5y = 5x + 10$

24. If $P(x, y)$ is any point on the line segment joining the points $(a, 0)$ and $(0, b)$, then, prove that $\frac{x}{a} + \frac{y}{b} = 1$ where $a, b \neq 0$.

25. In $\triangle ABC$, $AB = AC$ and $BC = 6$ cm. D is a point on the side AC such that $AD = 5$ cm and $CD = 4$ cm. find BD .

26. 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.

27. Find the volume of a sphere-shaped shot-put having diameter of 8.4 cm.

28. Find the range and the coefficient of range of 43, 24, 38, 56, 22, 39, 45.

- 29. A two digit number is formed with the digits 3,5 and 7. Find the probability that the number so formed is greater than 57.(repetition of digits is not allowed)
- 30. (a) Find the third term when the product of first five terms of a G.P is 32.

(or)

(b) Prove the identity $(\sin^6 \theta + \cos^6 \theta) = 1 - 3\sin^2 \theta \cos^2 \theta$.

SECTION - C

III. Answer any 9 questions: (Q.No.45 is compulsory)

9 x 5 = 45

- 31. Given $P = \{a, b, c, d, e\}$, $Q = \{a, e, i, o, u\}$ and $R = \{a, c, e, g\}$. Verify the associative property of set intersection using venn diagram.
- 32. A function $f : [-3,7) \Rightarrow \mathbb{R}$ is defined as follows

$$f(x) = \begin{cases} 4x^2 - 1; & -3 \leq x \leq 2 \\ 3x - 2; & 2 < x \leq 4 \\ 2x - 3; & 4 < x \leq 6 \end{cases}$$

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. If a person joins his work in 2010 with an annual salary of Rs.30,000 and receives an annual increment of Rs.600 every year, in which year, will his annual salary be Rs.39,000?
- 34. Find the sum of the following series $5^2 + 7^2 + 9^2 + \dots + 39^2$
- 35. The speed of a boat in still water is 15km/hr. It goes 30 km upstream and return downstream to the original point in 4 hrs 30 minutes. Find the speed of the stream.
- 36. Show that the roots of the equation $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$ are always real and the cannot be equal unless $a = b = c$.

37. If $A = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$ and $C = [2 \ 1]$ verify $(AB)C = A(BC)$.

38. In an isosceles ΔPQR , $PQ = PR$. The base QR lies on the x-axis, P lies on the y-axis and $2x - 3y + 9 = 0$ is the equation of PQ . Find the equation of the straight line along PR .

39. State and prove Angle Bisector theorem.

40. Prove that $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$

41. 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.

- 42. Water in a cylindrical tank of diameter 4m and height 10m is released through a cylindrical pipe of diameter 10cm at the rate of 2.5 Km/hr. How much time will it take to empty the half of the tank? Assume that the tank is full of water to begin with.
- 43. Calculate the variance.

Length (cm)	1-10	11-20	21-30	31-40	41-50	51-60	61-70
No. of bits	2	3	8	12	9	5	1

- 44. The probability that A, B and C can solve a problem are $\frac{3}{5}$, $\frac{2}{3}$ 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 at least one of them.
- 45. (a) Solve the quadratic equation by completing the square : $4x^2 + 4bx - (a^2 - b^2) = 0$ (or)
 (b) If (7, 3), (6,1), (8, 2) and (p, q) are the vertices of a parallelogram taken in order, then find the value of p and q.

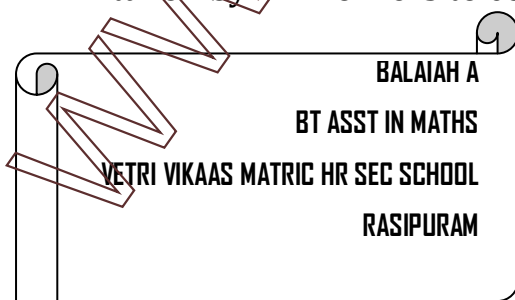
SECTION - D

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

- 46. a) Draw a circle of radius 4.8 cm. Take a point on the circle. Draw the tangent at that point using the tangent - chord theorem. (or)
 b) Construct a ΔABC such that $BC = 5$ cm, $\angle A = 45^\circ$ and the median from A to BC is 4 cm.
- 47. a) Draw the graph of the function $y = 3x^2$. (or)
 b)

No. of workers	x	3	4	6	8	9	16
No. of days	y	96	72	48	36	32	18

Draw graph for the data given in the table. Hence find the number of days taken by 12 workers to complete the work.



*** "DO IT AND GET IT" ***