SEAL

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Series : **a**

Question Booklet No. **390041**

DT/08/24

PAPER—II

MATHEMATICS

Invigilator's Signature

Candidate's Signature

Time : 2 Hours **Maximum Marks : 100**

ROLL NO. | | | | | | |

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SEAL

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1. If the roots of $px^2 + q = 0$ are real and distinct, then which of the following is ***correct***?

[A] $pq > 0$

[B] $pq < 0$

[C] $p = 0$

[D] $p > 0, q > 0$

2. The curve represented by

$$z\bar{z} + (1+i)z + (1-i)\bar{z} = 0$$

is

[A] an ellipse

[B] a circle

[C] a hyperbola

[D] a straight line

3. The sequence $\left\{\frac{(-1)^{n-1}}{n} : n \in \mathbb{N}\right\}$

[A] converges to the limit zero

[B] oscillates infinitely

[C] oscillates finitely

[D] diverges to $-\infty$

4. The number of solutions of $2x + y = 4$, $x - 2y = 2$ and $3x + 5y = 6$ is

[A] 0

[B] 2

[C] 1

[D] infinite

5. If e^z is a positive real number, then

[A] $\text{Re}\, z = 2n\pi$, where n is an integer

[B] $\text{Im}\, z = \frac{n\pi}{2}$, where n is an integer

[C] $\text{Im}\, z = n\pi$, where n is an integer

[D] $\text{Re}\, z = 3n\pi$, where n is an integer

6. Let A be a 3×3 square matrix, then determinant of $4A$ is

[A] $4|A|$

[B] $16|A|$

[C] $64|A|$

[D] $81|A|$

7. If A is an idempotent square matrix, then $(I + A)^3 - 7A$ is equal to

[A] I

[B] A

[C] $I - A$

[D] $3A$

8. The sum of the cofactors of the elements of the matrix $\begin{bmatrix} 1 & 3 \\ 2 & 6 \end{bmatrix}$ is

[A] 6

[B] 4

[C] 12

[D] 2

9. If $A = [a_{ij}]_{2\times 2}$ matrix where $a_{ij} = \frac{(i+2j)^2}{2}$, then $|A|$ is equal to

[A] –25

[B] 25

[C] 31

[D] –19

10. If the area of triangle is 30·5 sq units with vertices (3, 8), (k, 2) and (5, 1), then the value of k is

[A] –4

[B] –6

[C] 12

[D] –12

11. If the system of equations $2x + by = 16$, $4x + 8y = g$ has infinitely many solutions, then the value of (b, g) is

[A] $(2, 5)$

[B] $(0, 5)$

[C] $(4, 32)$

[D] $(5, 0)$

12. Which of the following matrices is ***not*** guaranteed to equal to $(A + B)^2$?

[A] $A^2 + AB + BA + B^2$

[B] $(A + B)(B + A)$

[C] $A^2 + 2AB + B^2$

[D] $A(A + B) + B(B + A)$

13. The line $y = mx + 1$ is a tangent to the curve $y^2 = 2x$, if the value of m is

[A] $\frac{1}{2}$

[B] 2

[C] 1

[D] 4

14. If $2 + i\sqrt{3}$ is a root of $x^2 + px + q = 0$ where p and q are real, then (p, q) is

[A] $(7, 4)$

[B] $(-4, 7)$

[C] $(-7, 4)$

[D] $(7, -4)$

15. Find the interval in which the function

$$f(x) = 2x^3 - 15x^2 + 36x + 1$$

is decreasing.

[A] $(1, 5)$

[B] $(3, \infty)$

[C] $(1, 3)$

[D] $(-\infty, 1)$

16. The sum of $\begin{bmatrix} 7 & 4 \\ 5 & 3 \end{bmatrix}$ and its multiplicative inverse is

[A] $\begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$

[B] $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

[C] $\begin{bmatrix} 14 & 8 \\ 10 & 6 \end{bmatrix}$

[D] $\begin{bmatrix} 0 & 3 \\ 2 & 4 \end{bmatrix}$

17. The degree of the differential equation

$$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^{\frac{2}{3}} + xy^5 = 0$$

is

[A] 5

[B] 6

[C] 2

[D] 3

18. The integrating factor of the linear differential equation $\frac{dy}{dx} + y \cot x = \tan x$ is

[A] $\cot x$

[B] $e^{\cot x}$

[C] $\sin x$

[D] $-\text{cosec}^2 x$

19. The solution of the differential equation $\frac{dy}{dx} = \frac{x}{y}$ represents geometrically

[A] a hyperbola

[B] an ellipse

[C] a parabola

[D] a straight line

20. The value of $\lim_{x \to 0} \frac{\sqrt{1 - \cos x}}{x}$ is

[A] 1

[B] $\frac{1}{\sqrt{2}}$

[C] 0

[D] $\sqrt{2}$

21. If $|z| = 2$ and arg $z = \frac{3\pi}{4}$, then z is

[A] $-\sqrt{2} - i\sqrt{2}$

[B] $\sqrt{3} - i$

[C] $-\sqrt{3} + i$

[D] $-\sqrt{2} + i\sqrt{2}$

22. The minimum value of $\sin x \cos x$ is

[A] 0

[B] $-\frac{1}{2}$

[C] -1

[D] $\frac{1}{2}$

23. If $\sqrt{x+1} - \sqrt{x-1} = 1$, , then the value of x is

[A] $\frac{4}{5}$

[B] $\frac{5}{4}$

[C] $\frac{2}{3}$

[D] $\frac{3}{5}$

24. The differential equation of all circles which passes through the origin and whose centre lies on y-axis is

[A] $(x^2 - y^2)\frac{dy}{dx} - 2xy = 0$

[B] $(x^2 - y^2)\frac{dy}{dx} + 2xy = 0$

[C] $(x^2 - y^2)\frac{dy}{dx} - xy = 0$

[D] $(x^2 - y^2)\frac{dy}{dx} + xy = 0$

25. The value of the determinant

$$\begin{vmatrix} 0 & -a & -b \\ a & 0 & c \\ b & -c & 0 \end{vmatrix}$$

is

[A] abc

[B] $a^2b^2c^2$

[C] $-abc$

[D] 0

26. If A and B are two matrices and AB exists, then BA exists

[A] only if A and B are square matrices of same order

[B] only if A and B are symmetric matrices

[C] only if A and B are skew-symmetric matrices

[D] None of the above

27. The system of equations $ax + by = 0$ and $cx + dy = 0$ has a trivial solution if and only if

[A] $ad - bc = 0$

[B] $ad - bc > 0$

[C] $ad - bc \neq 0$

[D] $ad - bc < 0$

28. The area bounded by $y = x$ and $y^2 = x$ is

[A] $\frac{1}{3}$ sq. units

[B] $\frac{2}{3}$ sq. units

[C] $\frac{1}{6}$ sq. units

[D] $\frac{1}{2}$ sq. units

29. The value of $\int_0^1 \frac{1}{\sqrt{1-x^2}}\,dx$ is

[A] $\frac{\pi}{4}$

[B] $\frac{\pi}{3}$

[C] π

[D] $\frac{\pi}{2}$

30. The value of $\int_2^3 \frac{x^2}{1+x^2}\,dx$ is

[A] $1 - \tan^{-1}\left(\frac{1}{7}\right)$

[B] $1 + \tan^{-1}\left(\frac{1}{7}\right)$

[C] $2 + \tan^{-1}\left(\frac{1}{7}\right)$

[D] $1 - \tan^{-1}\left(\frac{2}{7}\right)$

31. If $y = (3x+2)^n$, then y_5 is

[A] $\frac{n!}{(n-5)!}3(3x+2)^{n-5}$

[B] $\frac{n!}{(n-5)!}3^5(3x+2)^{n-5}$

[C] $\frac{n!}{(n-5)!}(3x+2)^{n-5}$

[D] $(n-5)!\,(3x+2)^{n-5}$

32. The value of $\lim_{n\to\infty} \frac{n^2+3n}{n^3-4}$ is

[A] ∞

[B] 0

[C] $-\infty$

[D] $\frac{1}{3}$

33. $\int\sqrt{\frac{x}{a-x}}\,dx$ is equal to

[A] $a\sin^{-1}\sqrt{\frac{x}{a}} + \sqrt{x(x-a)} + c$

[B] $a\sin^{-1}\sqrt{\frac{x}{a}} - \sqrt{x(a-x)} + c$

[C] $a\sin^{-1}\sqrt{\frac{x}{a}} + \sqrt{a(x-a)} + c$

[D] $a\sin^{-1}\sqrt{\frac{x}{a}} - \sqrt{a(x+a)} + c$

34. The value of $\hat{i}.(\hat{j}\times\hat{k}) + \hat{j}.(\hat{k}\times\hat{i}) + \hat{k}.(\hat{j}\times\hat{i})$ is

[A] 2

[B] 0

[C] 3

[D] 1

35. The domain of $\sin^{-1}\left[\log_5\left(\frac{x}{5}\right)\right]$ is

[A] $[1, 5]$

[B] $[1, 25]$

[C] $[-1, 1]$

[D] $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

36. If $\begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 2 & -8 \end{bmatrix}$, then the values of x, y, z, w are

[A] 2, 4, 4, –6

[B] 4, 4, –6, 2

[C] 4, 2, 2, 0

[D] 4, 2, –6, 4

37. If p, q, r are distinct positive real numbers in arithmetic progression, then the roots of the equation $px^2 + 2qx + r = 0$ are

[A] rational and equal

[B] real and distinct

[C] rational and distinct

[D] irrational

38. The solution of the differential equation $\frac{dy}{dx} = \frac{x+y}{x}$ is

[A] $x + y = c$

[B] $y = ce^{-x}$

[C] $y = ce^{\frac{y}{x}}$

[D] $x = ce^{\frac{y}{x}}$

39. The unit vector perpendicular to both $\hat{i}+\hat{j}$ and $\hat{j}+2\hat{k}$ is

[A] $\frac{2\hat{i}+\hat{j}-2\hat{k}}{3}$

[B] $\frac{2\hat{i}-2\hat{j}-\hat{k}}{3}$

[C] $\frac{2\hat{i}-2\hat{j}+\hat{k}}{3}$

[D] $\frac{2\hat{i}+\hat{j}+2\hat{k}}{3}$

40. If a, b, c are in arithmetic progression, a, x, b are in geometric progression and b, y, c are also in geometric progression, then the point (x, y) lies on

[A] a straight line

[B] a circle

[C] an ellipse

[D] a hyperbola

41. The triangle formed by $x^2 - y^2 = 0$ and $y = 4$ is

[A] equilateral

[B] scalene

[C] isosceles

[D] obtuse angled triangle

42. The coordinates of the image of the origin with respect to the straight line $x + y + 2 = 0$ are

[A] $(1, 1)$

[B] $(-1, -1)$

[C] $(-2, -2)$

[D] $(4, -2)$

43. The projection of the vector $\hat{i} + 3\hat{j} - 2\hat{k}$ on the vector $3\hat{i} + 8\hat{j} + 4\hat{k}$ is

[A] $\frac{1}{\sqrt{89}}$

[B] $\frac{19}{\sqrt{89}}$

[C] $\frac{3}{\sqrt{89}}$

[D] $\frac{-2}{\sqrt{89}}$

44. If the lines $2x - y = 5$, $x + ay = 5$ and $x + 3y = 6$ are concurrent, then a is equal to

[A] -1

[B] 2

[C] 3

[D] 32

45. The area bounded by the curves $2|x| + y = 1$ and $y = 0$ is

[A] 1

[B] 2

[C] $\frac{1}{4}$

[D] $\frac{1}{2}$

46. The equation of the line passing through the point $(2,2)$ and perpendicular to the line $2x - 3y + 5 = 0$ is

[A] $3x + 2y = 10$

[B] $2x + 3y = 10$

[C] $3x - 2y = 2$

[D] $2x - 3y + 2 = 0$

47. If the point R (5, 7) divides the join of P (9, 2) and Q (x, y) externally in the ratio 2 : 3, then the coordinates of Q are

[A] $\left(7, \frac{1}{4}\right)$

[B] $\left(11, \frac{1}{4}\right)$

[C] $\left(11, -\frac{1}{2}\right)$

[D] $\left(7, -\frac{1}{4}\right)$

48. For square matrices A, B of same order, which of the following is ***correct***?

[A] det $AB >$ det A . det B

[B] det $AB <$ det A . det B

[C] det $AB =$ det A . det B

[D] det $AB =$ det $A +$ det B

49. If the centroid of a triangle formed by the points $(\alpha, 1)$, $(\beta, 3)$, $(-1, \gamma^2 + 1)$ lies on the y-axis, then

[A] $\alpha + \beta = \gamma^2 + 1$

[B] $\alpha + \beta = -1$

[C] $\alpha + 1 = 0$

[D] $\alpha + \beta = 1$

50. Distance between the parallel lines $3x + 4y = 7$ and $3x + 4y + 3 = 0$ is

[A] 4

[B] 2

[C] 10

[D] 5

51. The ratio in which the line joining (3, 5, 2) and (–4, –6, 7) is divided by *ZX*- plane is

[A] 3 : –4

[B] 4 : 3

[C] 6 : 5

[D] 5 : 6

52. The equation of the plane passing through the line of intersection of the planes $x + 2y + 3z - 6 = 0$ and $2x - y + z = 5$, the point (1, 0, 1) is

[A] $x - 3y - 2z + 1 = 0$

[B] $2x - y + 2z - 4 = 0$

[C] $x - y + 2z - 3 = 0$

[D] $x - y + z = 2$

53. The equation of *YZ*-plane is

[A] $y = 0,\ z = 0$

[B] $y = 0$

[C] $x = 0$

[D] $y + z = c$, c is non-zero real number

54. The perpendicular distance of the point (7, 4, 3) from the *x*-axis is

[A] 3 units

[B] 7 units

[C] 11 units

[D] 5 units

55. The plane $2x + 3y + 6z - 25 = 0$ makes an angle $\sin^{-1} b$ with the *y*-axis. The value of b is

[A] $\frac{2\sqrt{10}}{7}$

[B] $\frac{2\sqrt{3}}{7}$

[C] $\frac{-\sqrt{3}}{7}$

[D] $-\frac{3}{7}$

56. A plane makes intercepts 2 and 3 respectively on *x*-axis and *y*-axis. If it is parallel to *z*-axis, then its equation is

[A] $3x + 2y = 6$

[B] $2x + 3y = 6$

[C] $x + y = 5$

[D] $y + z = 6$

57. The points $(5, 4, 2)$, $(6, -1, 3)$ and $(7, -6, k)$ are collinear, if k is equal to

[A] 5

[B] 4

[C] 0

[D] -2

58. The equation of the plane that passes through the point $(2, 1, -5)$ and has direction ratios $(2, 3, -1)$ is

[A] $5x + 5y + z = 12$

[B] $6x + 3y + z = 12$

[C] $2x + 3y - z = 12$

[D] $2x - y + 3z = 12$

59. If $\alpha > \beta$, then the angle between $x\cos\alpha + y\sin\alpha = p$ and $x\cos\beta + y\sin\beta = p$ is

[A] $\alpha + \beta$

[B] $\alpha - \beta$

[C] $\frac{\alpha}{\beta}$

[D] $\alpha \times \beta$

60. The equation of the straight line which passes through the point $(3, -2)$ and makes an angle of $\frac{\pi}{4}$ with the axis of x is

[A] $2y = 3x - 13$

[B] $y = 2x - 8$

[C] $y = x - 5$

[D] $3y = 2x - 12$

61. If $b^2x^2 + a^2y^2 = a^2b^2$, then $\frac{d^2y}{dx^2}$ is

[A] $\frac{b^4}{a^2y^3}$

[B] $-\frac{b^4}{a^2y^3}$

[C] $\frac{a^4}{b^2y^3}$

[D] $-\frac{a^4}{b^2y^3}$

62. The value of $\lim_{x\to 0} \frac{\sqrt{1+x}-1}{x}$ is

[A] $\frac{1}{2}$

[B] $-\frac{1}{2}$

[C] $\frac{1}{\sqrt{2}}$

[D] Does not exist

63. If $\cos(x + y) = \log(x + y)$, then $\frac{dy}{dx}$ is equal to

[A] 1

[B] -1

[C] 2

[D] -2

64. The differential coefficient of $\tan^{-1}\frac{2x}{1-x^2}$ with respect to $\sin^{-1}\frac{2x}{1+x^2}$ is

[A] $2x$

[B] -1

[C] $-\frac{1}{2}$

[D] 1

65. The value of $\frac{d^{12}}{dx^{12}}(2\sin x\cos 3x)$ is

[A] $4^{12}\sin 4x - 2^{12}\sin 2x$

[B] $4^{12}\sin 4x + 2^{12}\sin 2x$

[C] $4^{12}\cos 4x - 2^{12}\cos 2x$

[D] $4^{12}\cos 4x + 2^{12}\cos 2x$

66. If $z_1 = -2+2i$ and $z_2 = 3i$, then the $\arg(z_1 z_2)$ is

[A] $\frac{2\pi}{3}$

[B] $\frac{\pi}{3}$

[C] $\frac{3\pi}{4}$

[D] $\frac{\pi}{4}$

67. For what value of k, the function $f(x) = x^3 + 6x^2 + (9+2k)x + 1$ is strictly increasing for all x?

[A] $k = -3$

[B] $k > 0$

[C] $k < 0$

[D] $k = 2$

68. If $x = t - \sin t$, $y = 1 - \cos t$, then the value of $\frac{d^2y}{dx^2}$ at $t = \frac{\pi}{3}$ is

[A] 1

[B] $\frac{4}{9}$

[C] -4

[D] 2

69. Which two of the functions $\sin x$, e^x and $\log x$ are continuous on $\mathbb{R}$?

[A] $\sin x$ and e^x

[B] $\sin x$ and $\log x$

[C] $\log x$ and e^x

[D] None of the above

70. The function $f(x) = |x-1|$ is

[A] continuous for all x

[B] discontinuous at $x = 1$ only

[C] continuous at $x = 1$ only

[D] discontinuous for all x

71. If $f(x) = [x]$, the greatest integer function, then $\lim_{x\to 0+} f(x)$ is

[A] 1

[B] -1

[C] 0

[D] Does not exist

72. For the complex numbers $z_1 = 2e^{1+i}$, $z_2 = 3e^{-i}$ and $z_3 = \frac{1}{2}e^{-1+2i}$, the complex number $\frac{z_1\bar{z}_2}{z_3}$ is equal to

[A] $2e^{1+2i}$

[B] $3e^{2-2i}$

[C] $12e^2$

[D] $12e^{2-2i}$

73. The value of $\sum_{n=0}^{N}(-1)^n$ is

[A] $\frac{1}{2}[1+(-1)^N]$

[B] $\frac{1}{2}[1-(-1)^N]$

[C] $[1-(-1)^{N+1}]$

[D] $\frac{1}{2}[1-(-1)^{N+1}]$

74. The component of the force $\vec{F}=\hat{i}-\hat{j}+\hat{k}$ in the direction of the vector $2\hat{i}+3\hat{j}+6\hat{k}$ is

[A] $\frac{5}{2}$

[B] $\frac{2}{7}$

[C] $\frac{5}{7}$

[D] $\frac{2}{11}$

75. If the vectors $\vec{p}=a\hat{i}+\hat{j}+2\hat{k}$, $\vec{q}=\hat{i}+b\hat{j}-\hat{k}$ and $\vec{r}=\hat{i}-\hat{j}+c\hat{k}$ are mutually perpendicular, then the values of a, b and c are

[A] $a=1, b=1, c=-1$

[B] $a=0, b=1, c=1$

[C] $a=1, b=-1, c=0$

[D] $a=1, b=1, c=0$

76. The curves for which the intercept cut off by a tangent on the x-axis is equal to 4 times the ordinate of the point of contact are

[A] $y^4=ce^{\frac{x}{y}}$

[B] $y^4=ce^{-\frac{x}{y}}$

[C] $y^4=ce^{xy}$

[D] $y^4=ce^{-xy}$

77. The integrating factor of

$x(1-x^2)dy+(2x^2y-y-ax^3)dx=0$

is

[A] $[x^2\sqrt{1-x^2}]^{-1}$

[B] $[x\sqrt{x^2-1}]^{-1}$

[C] $[x^2\sqrt{x^2-1}]^{-1}$

[D] $[x\sqrt{1-x^2}]^{-1}$

78. The arithmetic mean and geometric mean of roots of a quadratic equation are 8 and 5 respectively, then the discriminant of the equation is

[A] 400

[B] $\sqrt{156}$

[C] $\sqrt{256}$

[D] 156

79. The points of the curve $y=x^3+x-2$ where its tangent parallel to the straight line $y=4x-1$ are

[A] $(0,-2)$ and $(-1,-4)$

[B] $(1,0)$ and $(0,-2)$

[C] $(1,0)$ and $(2,8)$

[D] $(1,0)$ and $(-1,-4)$

80. If $y=(\tan^{-1}x)^2$, then

$(x^2+1)^2\frac{d^2y}{dx^2}+2x(x^2+1)\frac{dy}{dx}$

is equal to

[A] 2

[B] -2

[C] $-2y$

[D] $2y$

81. The number of reasoning in mathematics is

[A] 2

[B] 3

[C] 9

[D] 5

82. Which of the following could be a contributing factor towards underachievement in Mathematics?

[A] Gender

[B] Socio-cultural background

[C] Nature of Mathematics

[D] Innate ability of person

83. Consider the statements :

P : External examination simulates learning and teaching by providing a goal before the students and the teachers.

Q : External examinations have prognostic values.

Which of the following is ***correct***?

[A] Only **P** is correct

[B] Only **Q** is correct

[C] Both **P** and **Q** are correct

[D] Both **P** and **Q** are incorrect

84. In order to identifying the individual difficulties or gaps in student's knowledge before or during instruction, an appropriate test teacher can administer is

[A] summative assessments

[B] formative assessments

[C] diagnostic assessments

[D] peer assessments

85. The following questions are posed by a teacher in his class :

I. What is the area of a circle whose circumference is 49 cm?

II. Find a set of rectangles whose area is 24 sq.cm.

III. Find the average of first 10 prime numbers.

IV. Tell anything mathematical information you know about pyramids.

[A] I and III are closed ended and II and IV are open ended

[B] I and III are open ended and II and IV are closed ended

[C] I and II are closed ended and III and IV are open ended

[D] I and II are open ended and III and IV are closed ended

86. Which of the following is ***not*** specific objective of Mathematics learning?

[A] Understanding concept

[B] Quick calculation of Mathematics

[C] Applying proper method

[D] Problem solving

87. Summarization, linking or combinations of errors found while solving Mathematics problem is called

[A] error analysis

[B] content analysis

[C] content synthesis

[D] error synthesis

88. In class, the teacher posed the following problem to his students :

A group of students decided to collect as many paise from each member of the group as in the number of members. If the total collection amounts to ₹ 59·29, find the number of students.

Which of the following concepts would be required to solve the given problem?

[A] Concept of linear equation

[B] Concept of division

[C] Concept of quadratic equation

[D] Concept of combinatorics

89. "Between any two distinct rational numbers there is always a rational number." This property of rational number is referred to as

[A] ordered property

[B] closed property

[C] dense property

[D] None of the above

90. The number $(1+i)^{4n} + (1-i)^{4n}$, $n \in \mathbb{N}$ is

[A] a complex number with unequal real and imaginary part

[B] a purely imaginary number

[C] a complex number with equal real and imaginary part

[D] a purely real part

91. If A is a square matrix of order 4, then $|\text{adj } A|$ is equal to

[A] $|A|^3$

[B] $|A|$

[C] $|A|^4$

[D] $|A|^2$

92. The third, fifth and seventh terms of a geometric series are ℓ, m, n respectively, then which of the following is ***correct***?

[A] $m^2 = \ell n$

[B] $\ell^2 = mn$

[C] $m^2 = \ell^2 + n^2$

[D] $n^2 = \ell^2 + m^2$

93. The equation of the normal to the curve $y = x(x-1)$ at the point $(1, 0)$ is

[A] $x - y = 1$

[B] $2x - y = 2$

[C] $x + y = 1$

[D] $y - 2x = 1$

94. $\int_0^{2\pi} |\sin x|\, dx$ is equal to

[A] 0

[B] 2

[C] 1

[D] 4

95. Number of real root(s) of the equation $2x^3 - 3x^2 - 12x - 6 = 0$ in the interval $(-1, 0)$ is

[A] 2

[B] 3

[C] 0

[D] 1

96. For differentiable function $f(x)$ defined on a closed interval $[a, b]$, the existence of c in (a, b) at which the tangent to the curve $f(x)$ is parallel to the line joining $(a, f(a))$ and $(b, f(b))$ is

[A] Rolle's theorem

[B] Lagrange's mean value theorem

[C] intermediate value property theorem

[D] Leibnitz's theorem

97. The thinking that involves generating novel responses to the original, unusual and varied situations is known as

[A] convergent thinking

[B] divergent thinking

[C] critical thinking

[D] logical thinking

98. At the practice and revision stage which of the following teaching methods is adequate and advantageous?

[A] Heuristic method

[B] Inductive method

[C] Analytic method

[D] Deductive method

99. Consider the following statements :

P : If a triangle is equilateral, then it is isosceles.

Q : If a triangle is isosceles, then it is equilateral.

Which of the following is ***correct***?

[A] The statement **P** is correct

[B] The statement **Q** is correct

[C] Both the statements **P** and **Q** are correct

[D] Both the statements **P** and **Q** are incorrect

100. Let $F(x) = \int_0^x \frac{1}{t^3 + t^2 + 1}\, dt$. Then the value of $\frac{dF}{dx}(2)$ is

[A] $\frac{1}{16}$

[B] $\frac{1}{6}$

[C] $\frac{1}{13}$

[D] $\frac{\pi}{2}$

SPACE FOR ROUGH WORK

SEAL

SPACE FOR ROUGH WORK

SEAL

★★★

SEAL

FINAL ANSWER KEY OF

LECTURER (DIET) 2024

MATHEMATICS

SET- A

Q NO.	ANS
1	B
2	B
3	A
4	C
5	C
6	C
7	A
8	D
9	D
10	A
11	C
12	C
13	A
14	B
15	A
16	A
17	D
18	C
19	A
20	B
21	D
22	B
23	B
24	A
25	D

Q NO.	ANS
26	A
27	C
28	C
29	D
30	A
31	B
32	B
33	B
34	D
35	B
36	D
37	B
38	D
39	C
40	B
41	C
42	C
43	B
44	B
45	D
46	A
47	C
48	C
49	D
50	B

Q NO.	ANS
51	D
52	A
53	C
54	D
55	A
56	A
57	B
58	C
59	B
60	C
61	B
62	A
63	B
64	D
65	A
66	C
67	D
68	C
69	A
70	A
71	C
72	C
73	D
74	C
75	D

Q NO.	ANS
76	B
77	D
78	D
79	D
80	A
81	A
82	B
83	C
84	C
85	A
86	B
87	D
88	C
89	C
90	D
91	A
92	A
93	C
94	D
95	D
96	B
97	B
98	D
99	A
100	C