

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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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] $\operatorname{Re} z = 2n\pi$, where n is an integer
- [B] $\operatorname{Im} z = \frac{n\pi}{2}$, where n is an integer
- [C] $\operatorname{Im} z = n\pi$, where n is an integer
- [D] $\operatorname{Re} z = 3n\pi$, 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

$$a_{ij} = \frac{(i+2j)^2}{2}, \text{ then } |A| \text{ is equal to}$$

- [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, ∞)
- [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] $-\operatorname{cosec}^2 x$

19. The solution of the differential equation

$$\frac{dy}{dx} = \frac{x}{y} \text{ represents geometrically}$$

- [A] a hyperbola
- [B] an ellipse
- [C] a parabola
- [D] a straight line

20. The value of $\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos x}}{x}$ 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 $\lim_{n \rightarrow \infty} \frac{n^2 + 3n}{n^3 - 4}$ 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 $\hat{i} \cdot (\hat{j} \times \hat{k}) + \hat{j} \cdot (\hat{k} \times \hat{i}) + \hat{k} \cdot (\hat{j} \times \hat{i})$ 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] $(7, \frac{1}{4})$
- [B] $(11, \frac{1}{4})$
- [C] $(11, -\frac{1}{2})$
- [D] $(7, -\frac{1}{4})$

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

- [A] $\det AB > \det A \cdot \det B$
- [B] $\det AB < \det A \cdot \det B$
- [C] $\det AB = \det A \cdot \det B$
- [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 $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$ 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 $\lim_{x \rightarrow 0^+} f(x)$ 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

★★★

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SEAL