

1. If $A = \{x, y \mid x^2 + y^2 = 25\}$ and $B = \{x, y \mid x^2 + 9y^2 = 144\}$ then $A \cap B$ contains :
 (A) One point (B) Two points
 (C) Three points (D) Four points
2. The number of subsets of a set containing n elements is :
 (A) n (B) $2^n - 1$
 (C) n^2 (D) 2^n
3. 20 teachers of a school either teach Maths or Physics. 12 of them teach Maths while 4 teach both the subjects. The number of teachers teaching Physics only is :
 (A) 12 (B) 8
 (C) 16 (D) None of these
4. If a relation R is defined on the set Z of integers as follows : . Then
 Domain $(R) =$
 (A) $\{3, 4, 5\}$ (B) $\{0, 3, 4, 5\}$
 (C) $\{0, \pm 3, \pm 4, \pm 5\}$ (D) None of these
5. If R is a relation on a finite set having n elements, then the number of relations on A is :
 (A) 2^n (B)
 (C) n^2 (D) n^n
6. R is a relation on the set Z of integers and it is given by . Then R is :
 $(a, b) \in R \Leftrightarrow |a - b| \leq 1$ (A) Reflexive and Transitive (B) Reflexive and Symmetric
 $(a, b) \in R \Leftrightarrow |a - b| \leq 3$ (C) Symmetric and Transitive (D) An equivalence relation
7. The equation represents a circle of radius :
 (A) 5 (B) $2\sqrt{5}$
 (C) $\frac{5}{2}$ (D) None of these
8. If Z_1, Z_2, Z_3 are complex numbers such that :
 $|Z_1| = |Z_2| = |Z_3| = \left| \frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3} \right| = 1$ then $|Z_1 + Z_2 + Z_3|$ is :
 (A) Equal to 1 (B) Less than 1
 (C) Greater than 1 (D) Equal to 3
9. The locus of point Z satisfying $\text{Re}(Z^2) = 0$ is :
 (A) A pair of straight lines (B) A circle
 (C) A rectangular hyperbola (D) None of these

10. If $Z_r = \cos\left(\frac{2r\pi}{5}\right) + i \sin\left(\frac{2r\pi}{5}\right)$, $r = 0, 1, 2, 3, 4$ then $Z_0 \times Z_1 \times Z_2 \times Z_3 \times Z_4$
- (A) -1 (B) 0
(C) 1 (D) None of these
11. If α, β, γ are the roots of the equation $x^3 + 4x + 1 = 0$. Then $(\alpha + \beta)^{-1} + (\beta + \gamma)^{-1} + (\gamma + \alpha)^{-1} =$
- (A) 2 (B) 3
(C) 4 (D) 5
12. Let A, G and H be the Arithmetic mean, Geometric mean and Harmonic mean of two positive numbers a and b. The quadratic equation whose roots are A and H is :
- (A) $Ax^2 - (A^2 + G^2)x + AG^2 = 0$ (B) $Ax^2 - (A^2 + H^2)x + AH^2 = 0$
(C) $Hx^2 - (H^2 + G^2)x + HG^2 = 0$ (D) None of these
13. G is a group under \otimes_7 where $G = \{1, 2, 3, 4, 5, 6\}$. If $5 \otimes_7 x = 4$ then $x =$
- (A) 0.8 (B) 4
(C) 3 (D) 5
14. In the group $G = \{1, 3, 7, 9\}$ under multiplication module 10, $(3 \times 7^{-1})^{-1}$ is equal to :
- (A) 9 (B) 5
(C) 7 (D) 3
15. The identity element in the group $M = \left\{ \begin{pmatrix} x & x \\ x & x \end{pmatrix} \mid x \neq 0 \text{ and } x \text{ is real} \right\}$ with respect to matrix multiplication is :
- (A) $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ (B) $\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$
(C) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (D) None of these
16. If $a * b = a^2 + b^2$, then the value of $(4 * 5) * 3$ is :
- (A) $(4^2 + 5^2) + 3^2$ (B) $(4 + 5)^2 + 3^2$
(C) $41^2 + 3^2$ (D) $(4 + 5 + 3)^2$

17. In Z , the set of all integers, the inverse of -7 with respect to \oplus defined by $a \oplus b = a + b + 1$ for all $a, b \in Z$ is :
- (A) -14 (B) 7
 (C) -7 (D) None of these
18. The units of the field $F = \{0, 2, 4, 6, 8\}$ under \oplus are :
- (A) $\{0\}$ (B) $\{2, 4, 6, 8\}$
 (C) F (D) None of these
19. $(Z_n, \oplus_n, \otimes_n)$ is a field if and only if n is :
- (A) Even (B) Odd
 (C) Prime (D) None of these
20. The ideals of a field F are :
- (A) Only $\{0\}$ (B) Only F
 (C) Both $\{0\}$ and F (D) None of these
21. Every finite integral domain is :
- (A) Not a field (B) Field
 (C) Vector space (D) None of these
22. The order of i in the multiplicative group of fourth roots of unity is :
- (A) 4 (B) 3
 (C) 2 (D) 1
23. The non-zero elements a, b of a ring $(R, +, \cdot)$ are called zero divisors if :
- (A) $a \cdot b = 0$ (B) $a + b = 0$
 (C) $a \cdot b \neq 0$ (D) $a + b \neq 0$
24. If the ring R is an integral domain then :
- (A) $R[x]$ is a field (B) $R[x]$ is an integral domain
 (C) $R[x]$ is not an integral domain (D) None of these
25. The product of an even permutation and an odd permutation is :
- (A) Even (B) Odd
 (C) Neither even nor odd (D) None of these

26. If _____ :

(A) $\begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$

(B) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

(D) None of the above

27. If $AB = A$ and $BA = B$ where A and B are square matrices then :

(A) $A^2 = A$ and $B^2 = B$

(B) $A^2 \neq A$ and $B^2 = B$

(C) $A^2 = A$ and $B^2 \neq B$

(D) $A^2 \neq A$ and $B^2 \neq B$

28. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then the value of $|\text{adj } A|$ is :

(A) a^{27}

(B) a^9

(C) a^6

(D) a^2

29. If $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, then $|\text{adj}(\text{adj } A)|$ is :

(A) 14^4

(B) 14^3

(C) 14^2

(D) 14

30. If $A = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$, and $A^T + A = I_2$ where A^T is the transpose of A and I_2 is the 2×2 Unit matrix.

Then:

(A) $\theta = n\pi, n \in \mathbb{Z}$

(B)

(C) $\theta = 2n\pi + \frac{\pi}{3}, n \in \mathbb{Z}$

(D) None of these

31. The matrix $A = \begin{bmatrix} 1 & -3 & -4 \\ -1 & 3 & 4 \\ 1 & -3 & -4 \end{bmatrix}$ is nilpotent of index :
- (A) 2 (B) 3
(C) 4 (D) None of these

32. The rank of the matrix $A = \begin{bmatrix} 2 & 3 & 1 & 4 \\ 0 & 1 & 2 & -1 \\ 0 & -2 & -4 & 2 \end{bmatrix}$ is :
- (A) 2 (B) 3
(C) 1 (D) Indeterminate

33. For what value of λ , the system of equations
 $x + y + z = 6$
 $x + 2y + 3z = 10$
 $x + 2y + \lambda z = 12$ is Inconsistent ?
- (A) $\lambda = 1$ (B) $\lambda = 2$
(C) $\lambda = -2$ (D) $\lambda = 3$

34. If A is a 3×3 matrix and B is its adjoint such that $|B| = 64$, then $|A| =$
- (A) 64 (B) ± 64
(C) $\frac{1}{64}$ (D) 18

35. If $A^3 = 0$, then $1 + A + A^2$ equals :
- (A) $1 - A$ (B) $(1 - A)^{-1}$
(C) $(1 + A)^{-1}$ (D) None of these

36. If $A =$ equals to :
- (A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} -1 & -2 \\ -3 & -4 \end{bmatrix}$
(C) $\begin{bmatrix} \frac{1}{2} & -\frac{1}{3} \\ -\frac{1}{2} & 0 \end{bmatrix}$ (D) $\begin{bmatrix} -\frac{1}{4} & \frac{1}{3} \\ \frac{1}{2} & 0 \end{bmatrix}$

37. If $s = a + b + c$ then the value of $\Delta = \begin{vmatrix} s+c & a & b \\ c & s+a & b \\ c & a & s+b \end{vmatrix}$ is :

- (A) $2s^2$ (B) $2s^3$
 (C) s^3 (D) $3s^3$

38. $\lim_{n \rightarrow \infty} \left[\frac{4^{\frac{1}{n}} - 1}{3^{\frac{1}{n}} - 1} \right]$ is equal to :

- (A) $\log_4 3$ (B) $\log_3 4$
 (C) 1 (D) None of these

39. The value of $\lim_{n \rightarrow \infty} \left[\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots + \frac{1}{(2n+1)(2n+3)} \right]$ is :

- (A) 1 (B) $\frac{1}{2}$
 (C) $-\frac{1}{2}$ (D) None of these

40. $\lim_{x \rightarrow \infty} \left[\frac{\int_0^{2x} x e^{x^2} dx}{e^{4x^2}} \right] =$

- (A) 0 (B) ∞
 (C) 2 (D)

41. The function $f(x) = \begin{cases} 1 - 2x + 3x^2 - 4x^3 + \dots + \infty & \text{if } x \neq -1 \\ 1 & \text{if } x = -1 \end{cases}$ is :

- (A) Continuous and differentiable at $x = -1$
 (B) Neither continuous nor differentiable at $x = -1$
 (C) Continuous but not differentiable at $x = -1$
 (D) None of the above

42. Let $f(x) = \begin{cases} \frac{\sin \pi x}{5x} & , x \neq 0 \\ K & , x = 0. \end{cases}$

If $f(x)$ is continuous at $x = 0$, then the value of K is :

- (A) $\frac{\pi}{5}$ (B)
 (C) 1 (D) 0

43. If $f(x)$ is differentiable and strictly increasing function, then the value of $\lim_{x \rightarrow 0} \left[\frac{f(x^2) - f(x)}{f(x) - f(0)} \right]$ is :

- (A) 1 (B) 0
 (C) -1 (D) 2

44. The number of points at which the function $f(x) = |x - 3| + |x + 1|$ does not have a derivative in the interval $[-4, 4]$ is :

- (A) 1 (B) 2
 (C) 3 (D) None of these

45. If $f(x)$ satisfies the conditions of Rolle's theorem in $[1, 2]$ and $f(x)$ is continuous in $[1, 2]$, then

$\int_1^2 f'(x) dx$ is equal to :

- (A) 3 (B) 0
 (C) 1 (D) 2

46. Let $f(x) = e^x$, $x \in [0, 1]$, then a number 'c' of the Lagrange's mean value theorem is :

- (A) $\log_e (e - 1)$ (B) $\log_e (e + 1)$
 (C) 1 (D) None of these

47. The maximum value of xy subject to $x + y = 8$ is :

- (A) 8 (B) 16
 (C) 20 (D) 24

48. The series $n - \frac{n^2}{2} + \frac{n^3}{3} - \frac{n^4}{4} + \dots - 1 < n \leq 1$ represents the function :

- (A) $\sin n$ (B) $\cos n$
 (C) $(1 + n)^n$ (D) $\log (1 + n)$

49. Expansion of $\sin x$ in powers of $\left(x - \frac{\pi}{2}\right)$ is :

(A) $\left(x - \frac{\pi}{2}\right) - \frac{\left(x - \frac{\pi}{2}\right)^3}{\underline{3}} + \frac{\left(x - \frac{\pi}{2}\right)^5}{\underline{5}} - + \dots$

(B) $\left(x - \frac{\pi}{2}\right) + \frac{\left(x - \frac{\pi}{2}\right)^3}{\underline{3}} + \frac{\left(x - \frac{\pi}{2}\right)^5}{\underline{5}} + \dots$

(C) $1 - \frac{\left(x - \frac{\pi}{2}\right)^2}{\underline{2}} + \frac{\left(x - \frac{\pi}{2}\right)^4}{\underline{4}} - + \dots$

(D) None of these

50. The equation of tangent to the curve $x = t^3 - 4$, $y = 2t^2 + 1$ at the point where $t = 2$ is :

(A) $2x - 3y - 19 = 0$

(B) $2x - 3y + 19 = 0$

(C) $2x + 3y - 19 = 0$

(D) $3x + 2y + 6 = 0$

51. If the normal to the curve $y^2 = 5x - 1$ at the point $(1, -2)$ is of the form $ax - 5y + b = 0$. Then 'a' and 'b' are :

(A) 4, -14

(B) 4, 14

(C) -4, 14

(D) -4, -14

52. The least value of $f(x) = 2x + \frac{8}{x^2}$, $x > 0$ is :

(A) 4

(B) 6

(C) 8

(D) None of these

53. The radius of curvature for the curve $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2} - \frac{r^2}{a^2 b^2}$ is :

(A) $\frac{p^2}{a^2 b^2}$

(B) $\frac{a^2 p^2}{b^2}$

(C) $\frac{a^2 b^2}{p^3}$

(D) $a^2 b^2 p^2$

54. The centre of curvature of the curve $y = x^2$ at $(0,0)$ is :
- (A) $\left(0, \frac{1}{2}\right)$ (B) $\left(\frac{1}{2}, \frac{1}{2}\right)$
 (C) $\left(\frac{1}{2}, 0\right)$ (D) None of these
55. The radius of curvature of the curve $r = a \sin n \theta$ at origin is :
- (A) na (B) $\frac{2na}{3}$
 (C) $2an$ (D) $\frac{2na}{3}$
56. The asymptote parallel to co-ordinate axes of the curve $(x^2 + y^2)x - ay^2 = 0$ is :
- (A) $y - a = 0$ (B) $y + a = 0$
 (C) $x - a = 0$ (D) $x + a = 0$
57. The asymptote of the curve $y = e^x$ is given by :
- (A) $y = 0$ (B) $x = 0$
 (C) $y = e$ (D) $x = e$
58. For the curve $y^2(1 + x) = x^2(1 - x)$, the origin is a :
- (A) Node (B) Cusp
 (C) Conjugate point (D) None of these
59. The curve $y = x^3 - 3x^2 - 9x + 9$ has a point of inflexion at :
- (A) $x = -1$ (B) $x = 1$
 (C) $x = -3$ (D) $x = 3$
60. The curve $y = \log x$ is :
- (A) Concave upwards in $(0, \infty)$ (B) Concave downwards in $(0, \infty)$
 (C) Concave upwards in $(-\infty, \infty)$ (D) Concave downwards in $(-\infty, \infty)$
61. The points of inflexion on the curve $x = (\log y)^3$ are :
- (A) $(0, 1)$ and $(8, e^2)$ (B) $(1, 0)$ and $(8, e^2)$
 (C) $(0, 1)$ and $(e^2, 8)$ (D) $(1, 0)$ and $(e^2, 8)$
62. The graph of $x = \frac{1 - t^2}{1 + t^2}$, $y = \frac{2t}{1 + t^2}$ is a :
- (A) Circle (B) Ellipse
 (C) Cycloid (D) None of these

63. The number of leaves in the curve $r = a \sin 5\theta$ are :
- (A) Two (B) Five
(C) Ten (D) None of these
64. If $u = f(y+ax) + \phi(y-ax)$ then $\frac{\partial^2 u}{\partial x^2} =$
- (A) $\frac{\partial^2 u}{\partial y^2}$ (B) $a^2 \frac{\partial^2 u}{\partial y^2}$
(C) $-a^2 \frac{\partial^2 u}{\partial y^2}$ (D) $a \frac{\partial^2 u}{\partial y^2}$
65. If $Z = \log(x^2 + y^2)$ then $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} =$
- (A) 0 (B) 1
(C) 2 (D) 3
66. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots + \infty}}}$ then $(2y-1) \frac{dy}{dx}$ is given by :
- (A) $\sin x$ (B) $\cos x$
(C) $\tan x$ (D) $\cot x$
67. The series $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - + \dots$ is :
- (A) Conditionally Convergent (B) Absolutely Convergent
(C) Divergent (D) None of the above
68. The series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + \dots$ is :
- (A) Conditionally Convergent (B) Absolutely Convergent
(C) Oscillatory (D) None of the above
69. The series $\sum_{n=1}^{\infty} \frac{(n - 2 \log n)^n}{2^n n^n}$ is :
- (A) Convergent (B) Divergent
(C) Oscillatory (D) None of these

70. The series $\sum_{n=1}^{\infty} \frac{n \cdot 2^n}{n^n}$ is :

- (A) Convergent (B) Divergent
(C) Oscillatory (D) None of these

71. The series $\sum_{n=1}^{\infty} \frac{4 \cdot 7 \cdot \dots \cdot (3n+1)}{1 \cdot 2 \cdot \dots \cdot x} x^n$ is Convergent if :

- (A) $|x| < 1$ (B)
(C) $|x| < \frac{1}{4}$ (D) $|x| < \frac{1}{2}$

72. $\int_1^2 \frac{\sqrt{x}}{\sqrt{3-x} + \sqrt{x}} dx =$

- (A) 0 (B) $\frac{1}{2}$
(C) 1 (D) None of these

73. $\int_0^{\frac{\pi}{2}} \frac{2^{\sin x}}{2^{\sin x} + 2^{\cos x}} dx =$

- (A) $\left[\frac{1}{3n+1} + \frac{1}{2} \frac{1}{n+3} + \dots + \frac{1}{2n} \right] =$ (B)
(C) (D)

74.

- (A) $\log_e 2$ (B) $\log_e 3$
(C) $\log_e 6$ (D) None of these

75. The entire length of the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ is :

- (A) $8a$ (B) $4\sqrt{3}a$
(C) $6a$ (D) $\sqrt{8}a$

76. The perimeter of $r = a(1 + \cos\theta)$ is :
 (A) a (B) $2a$
 (C) $4a$ (D) $8a$
77. The length of one arch of Cycloid $x = a(\theta + \sin\theta)$ $y = a(1 - \cos\theta)$ is :
 (A) a (B) $4a$
 (C) $8a$ (D) $32a$
78. The area bounded by the curve $y = 2x$, x - axis and the ordinates $x = -2$, $x = 3$ is equal to :
 (A) 2 (B) 13
 (C) 4 (D) 8
79. The area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is :
 (A) $2\pi ab$ (B) πab
 (C) $\frac{\pi ab}{2}$ (D) None of these
80. The area bounded by the curve $y^2 = x$ and $x^2 = y$ is given by :
 (A) 0 (B)
 (C) $\frac{2}{3}$ (D) 1
81. The whole area of the curve $r = a \cos 2\theta$ is :
 (A) $\frac{\pi a^2}{2}$ (B) πa^2
 (C) $2\pi a^2$ (D) $\frac{2\pi a^2}{3}$
82. The line $y = x + 1$ is revolved about x -axis. The volume of solid of revolution formed by revolving the area covered by the given curve, x -axis and the lines $x = 0$, $x = 2$ is :
 (A) $\frac{19\pi}{3}$ (B) $\frac{17\pi}{3}$
 (C) $\frac{13\pi}{3}$ (D)

83. The volume generated by revolution of the ellipse about major axis is

[assume that $a > b$]:

- (A) $\frac{4\pi ab^2}{3}$ (B) $\frac{4\pi a^2 b}{3}$
 (C) $\frac{4\pi a^2 b^2}{3}$ (D) None of these

84. The surface of the solid of revolution about x-axis of the area bounded by the curve $y = x$, x-axis and the ordinates $x = 0$ and $x = 3$ is equal to :

- (A) $4\sqrt{2} \pi$ (B) $9\sqrt{2} \pi$
 (C) $11\sqrt{2} \pi$ (D) $8\sqrt{2} \pi$

85. The value of $\int_0^{\frac{\pi}{2}} \sin^6 x \, dx = :$

- (A) $\frac{5\pi}{8}$ (B) $\frac{5\pi}{16}$
 (C) $\frac{5\pi}{32}$ (D) $\frac{5\pi}{64}$

$$\frac{3\pi}{4} + \frac{y^2}{2} = 1$$

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x \, dx$$

86. $\cos^3 \pi =$

- (A) 0 (B) $\cos \pi^3$
 (C) $2\cos^3 \pi$ (D) Does not exist

87. Order and degree of the differential equation $\sqrt{2\left(\frac{dy}{dx}\right)^3 + 4} = \left(\frac{d^2y}{dx^2}\right)^{3/2}$ are respectively :

- (A) order 2, degree 3 (B) order 1, degree 3
 (C) order 3, degree 2 (D) order 3, degree 1

88. If P, Q are functions of x, then solution of differential equation $\frac{dy}{dx} + Py = Q$ is :
- (A) $y e^{\int P dx} = \int Q e^{\int P dx} dx + c$ (B) $y = e^{\int P dx} \int Q e^{\int P dx} dx + C$
- (C) $y = \int Q e^{\int P dx} dx + C$ (D) None of these
89. The differential equation of the form $\frac{dy}{dx} + Py = Qy^n$ where P and Q are functions of x, is called :
- (A) Auxiliary equation (B) Bessel's equation
- (C) Clairaut's equation (D) Bernoulli's equation
90. The solution of $(y \cos x + 1) dx + \sin x dy = 0$ is :
- (A) $x - y \sin x = cx$ (B) $y + x \sin x = c$
- (C) $y - x \sin x = c$ (D) $x + y \sin x = c$
91. If at every point of a certain curve the slope of the tangent equals $\frac{-2x}{y}$, the curve is :
- (A) A straight line (B) A parabola
- (C) A circle (D) An ellipse
92. The integrating factor for the differential equation $(x^2y - 2xy^2) dx - (x^3 - 3x^2y) dy$ is given by :
- (A) (B) xy
- (C) x^2y^2 (D) $\frac{1}{x^2y^2}$
93. The general solution of $P = \log(px - y)$ is :
- (A) $y = cx - e^c$ (B) $y + cx = e^c$
- (C) $y + x = \log c$ (D) $y + c = e^x$
94. The general solution of a differential equation of first order represents :
- (A) A family of surfaces (B) A pair of curves in xy plane
- (C) A family of curves in xy plane (D) None of these

95. The singular solution of the differential equation $P^3 + Px - y = 0$ is $\left[\text{where } P = \frac{dy}{dx} \right]$:
- (A) $27y^2 + 4x^3 = 0$ (B) $y^2 = 4ax$
 (C) $x^2 + y^2 = a^2$ (D) None of these
96. The orthogonal trajectory of the family of curves $ay^2 = x^3$ is :
- (A) $3y^2 - 2x^2 = \text{constant}$ (B) $2x^2 + y^2 = \text{constant}$
 (C) $3x^2 + y^2 = \text{constant}$ (D) $2x^2 + 3y^2 = \text{constant}$
97. Solution of $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 0$ is :
- (A) $c_1e^{-2x} + c_2e^x$ (B) $c_1e^{2x} + c_2e^x$
 (C) $c_1e^{2x} + c_2e^{-2x}$ (D) None of these
98. The general solution of the differential equation $D^2(D+1)^2y = e^x$ is :
- (A) $y = c_1 + c_2x + (c_3 + c_4x)e^x$ (B) $y = c_1 + c_2x + (c_3 + c_4x)e^{-x} + \frac{e^x}{4}$
 (C) $y = c_1 + c_2e^{-x} + (c_3 + c_4x)e^{-x} + \frac{e^x}{4}$ (D) None of these
99. The particular integral of the differential equation $(D+2)(D-1)^3y = e^x$ is :
- (A) $\frac{x^3e^x}{18}$ (B) x^3e^x
 (C) $\frac{x^3e^x}{3}$ (D) None of these
100. The equation of the cylinder whose generators are parallel to the line $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ and whose guiding curve is $x^2 + 2y^2 = 1, z = 0$ is given by :
- (A) $(3z-x)^2 + 2(2z+3y)^2 = 9$ (B) $(3x+z)^2 + 2(3y-2z)^2 = 9$
 (C) $(3x-z)^2 + 2(3y+2z)^2 = 9$ (D) $(2z+3x)^2 + 2(3y-x)^2 = 9$

ROUGH WORK