MPPET 2010

Mathematics

Set – D

1. If a, b, c are in G.P and x, y are Arithmetic mean of a, b and b, c, then $\frac{a}{x}+\frac{c}{y}$ is equal to :

a) 2 b) 3 c) 4 d) 1

Ans : (a)

2. If a line makes α, β, γ, δ angles with four diagonals of a cube, then $\cos 2^{\alpha} + \cos 2\beta + \cos 2\gamma + \cos 2\delta$

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

Ans : (c)

3. The value of (E – 1) is (where E is shift operator)

a) E –1 Δ b) E –1 ∇ c) E –1 δ d) None of these

Ans : (a)

4. Solution of the differential equation $\frac{dy}{dx}=\cos(x+y)$ is

a) $\tan\frac{(x+y)}{2}=x+c$ b) $\tan\frac{(x+y)}{2}=-x+c$

c) $y = -x + c$ d) None of these

Ans : (a)

5. If α, β are roots of the equation $3x^2 + 4x – 6 = 0$, then $\alpha^2 + \beta^2$ is equal to :

a) $\frac{16}{9}$ b) $\frac{12}{9}$ c) $\frac{52}{9}$ d) None of these

Ans : (c)

6. If $C_r = {}^n C_r$ then the value of $\frac{C_0}{1}+\frac{C_2}{3}+\frac{C_4}{5}+\ldots\ldots\ldots\ldots=$ is

a) $\frac{2}{n+1}$ b) $\frac{2^n}{n+1}$ c) $\frac{2^{-n}}{n+1}$ d) None of these

Ans : (b)

7. If $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = 0$, Then the value of $a^{-1}+b^{-1}+c^{-1}$ is equal to

a) 1 b) -1 c) abc d) None of these

Ans : (b)

8. If $\vec{a}=i+j+k$, $\vec{b}=i+j$, $\vec{c}=i$ and $(\vec{a}\times\vec{b})\times\vec{c}=\lambda\vec{a}+\mu\vec{b}$, then $\lambda+\mu=$

a) 1 b) 0 c) 2 d) 3

Ans : (a)

9. The value of $\lim_{x\to 0}\frac{\sqrt{x^2+1}-1}{\sqrt{x^2+9}-3}$ is :

a) 3 b) 4 c) 1 d) 2

Ans : (a)

10. The differential equation of all conics whose centre lie at the origin is of order

a) 2 b) 3 c) 4 d) None of these

Ans : (a)

11. Equation of the common tangents to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is

a) $y=x\pm\sqrt{a^2-b^2}$ b) $y=x\pm\sqrt{b^2-a^2}$

c) $y=\pm x\pm\sqrt{a^2-b^2}$ d) $y=\pm x\pm\sqrt{b^2-a^2}$

Ans : (c)

12. If (0, β) lies on or inside the triangle with sides y + 3x + 2 = 0, 3y – 2x –5 = 0 and 4y + x –14 = 0, then :

a) $0\le\beta\le\frac{7}{2}$ b) $0\le\beta\le\frac{5}{2}$

c) $\frac{5}{3}\le\beta\le\frac{7}{2}$ d) None of these

Ans : (a)

13. If $y=\sin^{-1}\left(\frac{\sin\alpha.\sin x}{1-\cos\alpha.\sin x}\right)$, Then y' (0) is :

a) 1 b) 2 tan α c) $\frac{1}{2}$ tan α d) sin α

Ans : (d)

14. The coefficient of t^{24} in $(1+t^2)^2(1+t^{12})(1+t^{24})$ is

a) ${}^{12}C_6+3$ b) ${}^{12}C_6$ c) ${}^{12}C_6+1$ d) ${}^{12}C_6+2$

Ans : wrong options, answer is 1

15. The line 1x + my + n = 0 is a normal to the parabola $y^{-2}+4ax=0$, if :

a) $al(l^2+2m^2)+m^2n=0$ b) $al(l^2+2m^2)=m^2n$

c) $al(2l^2+m^2)+m^2n=0$ d) $al(2l^2+m^3)=2m^3n$

Ans : (b)

16. The plane $2x - y + 3z + 5 = 0$ is rotated at 90° angle with its line of intersection with the plane $5x - 4y - 2z + 1 = 0$. In new position equation of the plane will be :

a) $27x - 24y - 26z - 13 = 0$ b) $27x - 24y - 26z + 13$

c) $27x - 24y - 26z = 0$ d) $27x + 24y + 26z + 13 = 0$

Ans : (a)

17. If $\vec{a} = i - j, \vec{b} = j - k, \vec{c} = k - i$ and $\vec{d}$ is a unit vector such that $\vec{a}.\vec{a} = 0 = \left[\vec{b}\,\vec{c}\,\vec{d}\right]$, then $\vec{a}$ =

a) $\pm\frac{i+j-k}{\sqrt{3}}$ b) $\pm\frac{i+j+k}{\sqrt{3}}$

c) $\pm\frac{i+j-2k}{\sqrt{6}}$ d) $\pm k$

Ans : (c)

18. The eccentricity of the conjugate hyperbola to the hyperbola $x^2 - 3y^2 = 1$ is :

a) 2 b) $\frac{2}{\sqrt{3}}$ c) 4 d) $\frac{4}{3}$

Ans : (a)

19. The number of different words that can be formed from the letters of the word 'TRIANGLE' so that no vowels are together is

a) 7200 b) 36000 c) 14400 d) 1240

Ans : (c)

20. $2^{3n} - 7n - 1$ is divisible by :

a) 36 b) 49 c) 69 d) None of these

Ans : (b)

21. The value of $\int\frac{dx}{2+\cos x}$ is :

a) $\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{\tan\left(x/2\right)}{\sqrt{3}}\right)+c$ b) $-\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{\tan\left(x/2\right)}{\sqrt{3}}\right)+c$

c) $-\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{\tan\left(x/2\right)}{\sqrt{5}}\right)+c$ d) None

Ans : (a)

22. $\int_0^{\frac{\pi^2}{4}}\sin\sqrt{x}\,dx$ is

a) 0 b) 1 c) 2 d) 4

Ans : (c)

23. Area of the greatest rectangle that can be inscribed in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

a) $\frac{a}{b}$ b) $\sqrt{ab}$ c) ab d) 2ab

Ans : (d)

24. How many different signals can be made by 5 flags from 8 flags of different colours ?

a) 10 b) 6720 c) 20 d) None

Ans : (b)

25. The equation of that diameter of the ellipse $4x^2 + 9y^2 = 36$ which is conjugate to its diameter parallel to the line $x + 3y - 7 = 0$ is :

a) $4x - 3y = 0$ b) $4x + 3y = 0$ c) $3x - 4y = 0$ d) $3x + 4y = 0$

Ans : (a)

26. $\int \frac{x-1}{(x+1)(x-2)}dx$ is

a) $\frac{2}{3}\log|x+1|+\frac{1}{3}\log|x-2|+c$ b) $\frac{2}{3}\log(x+1)+\frac{1}{3}\log|x-2|+c$

c) $\frac{2}{3}\log|x+1|+c$ d) None

Ans : (a)

27. If $y = x + e^x$ then $\frac{d^2y}{dx^2}$ is :

a) e^x b) $\frac{-e^x}{(1+e^x)^3}$ c) $\frac{-e^x}{(1+e^x)^2}$ d) $\frac{1}{(1+e^x)^2}$

Ans : (a)

28. If the squares of the length os the tangents drawn from a point P to circles $x^2 + y^2 = a^2$, $x^2 + y^2 = b^2$, $x^2 + y^2 = c^2$ are in A.P., then :

a) a, b, c are in A.P., b) a, b, c are in G.P.

c) a^2, b^2, c^2 are in A.P. d) a^2 , b^2 , c^2 are in G.P.

Ans : (c)

29. In LPP ΔJ for all basic variables is equal to :

a) 1 b) –1 c) 0 d) None

Ans : (d)

30. If $\vec{a},\vec{b},\vec{c}$ are unit vectors, then maximum value of $|\vec{a}-\vec{b}|^2+|\vec{b}-\vec{c}|^2+|\vec{c}-\vec{a}|^2$ is equal to

a) 4 b) 9 d) 8 d) 6

Ans : (b)

31. Lines x = ay + b,z = cy +d and x = a' y +b' are perpendicular if :

a) aa' + cc' =1 b) aa' + cc' = –1 c) ac + a' c' = 1 d) ac + a' c' = –1

Ans : (b)

32. The all real roots of the given equation $\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$ is :

a) 2 b) 1 c) 0 d) ∞ (Infinite)

Ans : (a)

33. The radius of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ and with centre (0, 3) is :

a) 4 b) 3 c) $\frac{7}{2}$ d) $\sqrt{12}$

Ans : (a)

34. The value of $^{20}P_2$ is :

a) 20 b) 19 c) 380 d) None of these

Ans : (c)

35. The least value of $2\sin^2\theta + 3\cos^2\theta$ is :

a) 1 b) 2 c) 3 d) 5

Ans : (b)

36. If $n = {}^{m}C_2$ then the value of ${}^{n}C_2$ in equal to :

a) $(m+1)\ C_4$ b) $(m+2)\ C_4$ c) $(m-1)\ C_4$ d) $3(m+1)\ C_4$

Ans : (d)

37. If f (x) = $1/x^2$, then the value of divided difference f (a, b) is :

a) $-\frac{(a-b)}{a^2b^2}$ b) $-\frac{(a+b)}{a^2b^2}$ c) $\frac{a+b}{a^2b^2}$ d) None

Ans : (b)

38. The distance between the orthocenter and circumcentre of the triangle with vertices $(1, 0)\left(-\frac{1}{2},\frac{\sqrt{3}}{2}\right),\left(\frac{-1}{2},-\frac{\sqrt{3}}{2}\right)$ si

a) $\frac{1}{2}$ b) $\frac{\sqrt{3}}{2}$ c) $\frac{1}{3}$ d) 0

Ans : (d)

39. The value of $\Delta^{10}\left[(1-ax)(1-bx^2)(1-cx^3)(1-dx^4)\right]$ is :

a) abcd $\lfloor 5$ b) abcd $\lfloor 10$ c) abcd×10 d) $-$abcd $\lfloor 10$

Ans : (b)

40. The area of the parallelogram formed by the lines y = mx + 1, y = nx, y = nx + 1 is :

a) $\frac{|m+n|}{(m-n)^2}$ b) $\frac{2}{|m+n|}$ c) $\frac{1}{|m+n|}$ d) $\frac{1}{|m-n|}$

Ans : (d)

41. The point of intersection of common tangents to the conic $2(x^2+y^2)=a^2$ and $y^2=4ax$ is the focus of the parabola :

a) $x^2=4ay$ b) $x^2=-4ay$ c) $y^2=-4ax$ d) $y^2=-4a(x+a)$

Ans : (c)

42. If e be the eccentricity and αbe the angle between asymptotes of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, then $\sec\frac{\alpha}{2}=$

a) 0 b) e c) e^2 d) $\frac{e}{2}$

Ans : (b)

43. If the first term of A.P. be 'a', second the 'b' and n^{th} be '2a' then the sum of n terms is

a) $\frac{ab}{2(b-a)}$ b) $\frac{2ab}{3(b-a)}$ c) $\frac{2ab}{3(b-a)}$ d) $\frac{3ab}{(b-a)}$

Ans : (c)

44. Q, R and S are points on the line joining the points P(a, x) and T (b, y) such that PQ = RS = ST, then $\left(\frac{5a+3b}{8},\frac{5x+3y}{8}\right)$ is the mid – point of the line segment :

a) RS b) ST c) PQ d) QR

Ans : (d)

45. If $\sec A = x + \frac{1}{4x}$, Then the value of $\sec A + \tan A$ is :

a) $3x$ b) $\frac{x}{3}$ c) $\frac{x}{2}$ d) $2x$

Ans : (d)

46. The value of π radian is equal to :

a) 60° b) 180° c) 90° d) 360.

Ans : (b)

47. The maximum value of $24 \sin\theta + 7 \cos\theta$ is :

a) 1 b) 24 c) 25 d) 7

Ans : (c)

48. If $U_0 = 580$, $U_1 = 556$, $U_2 = 520$ and $U_4 = 385$, then the value of U_3 is :

a) 400 b) 413 c) 465 d) 460

Ans : (c)

49. If axis of the parabola $y = f(x)$ is parallel to y-axis and it touches the $y = x$ at (1, 1), then :

a) $f'(0) - 2\,2f(0) + 1 = 0$ b) $f'(0) + 2f(0) = 1$

c) $2f'(0) + 2f(0) = 1$ d) $2f'(0) - f(0) + 1 = 0$

Ans : (b)

50. The of $\lim_{x\to 0} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}, x \neq 0$ is :

a) 0 b) – 1 c) 1 d) None

Ans : (d)

51. If $\lim_{x\to c} \frac{f(x) - f(c)}{x - c}$ exists finitely, then :

a) $\lim_{x\to c} f(x) = f(c)$ b) $\lim_{x\to c} f'(x) = f'(c)$

c) $\lim_{x\to c} f(x)$ does not exist d) $\lim_{x\to c} f(x)$ may or not exist

Ans : (b)

52. If the curves $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and $\frac{x^2}{l^2} - \frac{y^2}{m^2} = 1$ cut each other orthogonally, then :

a) $a^2 + b^2 = l^2 + m^2$ b) $a^2 - b^2 = l^2 - m^2$

c) $a^2 - b^2 = l^2 + m^2$ d) $a^2 + b^2 = l^2 - m^2$

Ans : (c)

53. Let $\vec{a} = a_1 i + a_2 j + a_3 k$, $\vec{b} = b_1 i + b_2 j + b_3 k$ and $\vec{c} = c_1 i + c_2 j + c_3 k$ be three non-zero vectors such that $\vec{c}$ is a unit vector perpendicular to both $\vec{a}$ and $\vec{b}$. If the angle between vector $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$, then $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}^2 =$

a) 0
b) 1
c) $\frac{1}{4}\left(a_1^2 + a_2^2 + a_3^2\right)\left(b_1^2 + b_2^2 + b_3^2\right)$
d) $\frac{3}{4}\left(a_1^2 + a_2^2 + a_3^2\right)\left(b_1^2 + b_2^2 + b_3^2\right)\left(c_1^2 + c_2^2 + c_3^2\right)$

Ans : (c)

54. If $\vec{a}, \vec{b}, \vec{c}, \vec{d}$ are four different vectors such that $\vec{a} \times \vec{b} = \vec{c} \times \vec{d}$ and $\vec{a} \times \vec{c} = \vec{b} \times \vec{d}$, then :

a) $\vec{a}.\vec{c} + \vec{c}.\vec{d} = \vec{a}.\vec{c} + \vec{b}.\vec{d}$
b) $\vec{a}.\vec{b} + \vec{c}.\vec{d} \neq \vec{a}.\vec{c} + \vec{b}.\vec{d}$
c) $\vec{a}.\vec{b} - \vec{c}.\vec{d} = \vec{a}.\vec{c} - \vec{b}.\vec{d}$
d) $\vec{a}.\vec{b} - \vec{c}.\vec{d} \neq \vec{a}.\vec{c} - \vec{b}.\vec{d}$

Ans : (b)

55. The area bounded by the curved $y^2 = 2x + 1$ and $x = y + 1$ is

a) $\frac{2}{3}$ b) $\frac{4}{3}$ c) $\frac{8}{3}$ d) $\frac{16}{3}$

Ans : (d)

56. The order and degree of the differential equations $x\left(\frac{d^3y}{dx^3}\right)^2 + y\left(\frac{dy}{dx}\right)^4 + y^2 = 0;$ is :

a) order 2, degree 3
b) order 3, degree 2
c) order 2, degree 2
d) None of these

Ans : (b)

57. The value of $\Delta \cos h(a + bx)$ is :

a) $2\sin h\left(a + \frac{b}{2} + bx\right)\sin h\frac{b}{2}$
b) $2\cos h\left(a + \frac{b}{2} + bx\right)\sin h\frac{b}{2}$
c) $\sin h\frac{b}{2}x + \cos h\frac{b}{2}x$
d) None of these

Ans : (d)

58. The value of $\int \frac{dx}{(x-3)\sqrt{x+1}}$ is :

a) $\frac{1}{2}\log\left|\frac{\sqrt{x+1}-2}{\sqrt{x+1}+2}\right|+c_1$ b) $\frac{1}{2}\log\left|\frac{\sqrt{x+1}+2}{\sqrt{x+1}-2}\right|+c_1$

c) $\frac{1}{2}\log\left|\frac{\sqrt{x+1}-2}{\sqrt{x+1}-2}\right|+c_1$ d) None of these

Ans : (a)

59. The value of 8_{C_3} is equal to :

a) 18 b) 56 c) 28 d) 65

Ans : (b)

60. If $A=\begin{bmatrix}3 & 2\\ 1 & 4\end{bmatrix}$, Then A (AdjA) is equal :

a) $\begin{bmatrix}10 & 1\\ 1 & 10\end{bmatrix}$ b) $\begin{bmatrix}10 & 0\\ 0 & 10\end{bmatrix}$ c) $\begin{bmatrix}0 & 10\\ 10 & 0\end{bmatrix}$ d) $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

Ans : (a)

61. If $\vec{a}=i+j-k$, $\vec{b}=-i+2j+k$ and $\vec{c}=-i+2j-k$, then the vector perpendicular to $\vec{a}+\vec{b}$ and $\vec{b}+\vec{c}$ is :

a) i b) j c) k d) $\frac{i+j+k}{\sqrt{3}}$

Ans : (c)

62. The vectors (1, 0, 0), (0, 1, 0), (0, 0, 1) (1, 1, 1) are :

a) Linearly dependent
b) Linearly independent
c) Linearly dependent and Linearly independent
d) None of these

Ans : (b)

63. The angle between the lines $x\cos\alpha + y\sin\alpha = a$ and $x\sin\beta - y\cos\beta = a$ is :

a) $\beta-\alpha$ b) $\pi+\beta-\alpha$ c) $\frac{\pi}{2}+\beta+\alpha$ d) $\frac{\pi}{2}-\beta+\alpha$

Ans : (d)

64. If $3\sin A + 5\cos A = 5$, Then the value of $(3\cos A - 5\sin A)^2$ is :

a) 4 b) 5 c) 2 d) 9

Ans : (d)

65. If $U_0 = 3$, $U_1 = 12$, $U_2 = 81$, $U_3 = 200$, $U_4 = 100$ and $U_5 = 8$, then the value of $D\ ^5U_0$ is:

a)700 b) 755 c) 756 d) None

Ans : (b)

66. The value of a for which the function f (x) = a sin x + $\frac{1}{2}$ sin 3x has an extremum at x = $\frac{\pi}{3}$ is :

a) 1 b) –1 c) 0 d) 2

Ans : (d)

67. The value of y dx + (x –y^3) dy = 0 is

a) $xy = \frac{y^4}{4} + c$ b) $x = \frac{y}{4} + c$ c) $x = \frac{y^2}{4} + c$ d) None

Ans : (a)

68. The value of $\Delta^2 O^5$ is :

a) 20 b) 10 c) 30 d) 5

Ans : (a)

69. If $\sin^{-1} x + \sin^{-1} 2x = \frac{\pi}{3}$, Then the value of x :

a) $\frac{\sqrt{3}}{2\sqrt{7}}$ b) $\frac{\sqrt{3}}{\sqrt{7}}$ c) 0 d) 1

Ans : (a)

70. If $\vec{a}, \vec{b}$ are adjacent sides of a parallelogram, then $|\vec{a}+\vec{b}| = |\vec{a}-\vec{b}|$ is a necessary and sufficient condition for the parallelogram to be a :

a) square b) rectangle c) rhombus d) trapezium

Ans : (b)

71. If $\int_0^{\frac{\pi}{2}} \frac{x + \sin x}{1 + \cos x} dx$ is equal to :

a) π b) 2p c) $\frac{\pi}{2}$ d) None of these

Ans : (c)

72. The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is :

a) $xy = \frac{3}{4}$ b) $xy = \frac{35}{16}$ c) $xy = \frac{64}{105}$ d) $xy = \frac{105}{64}$

Ans : (d)

73. The value of $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1}$ is :

a) $\frac{1+\cos A}{\sin A}$ b) $\frac{1+\sin A}{\cos A}$ c) $\frac{1-\cos A}{1+\cos A}$ d) $\frac{1+\sin A}{1-\sin A}$

Ans : (b)

74. The value of $\int \cot x \, dx$ is :

a) log | sin x | + c b) log sin x + c
c) log cos x + c d) None of these

Ans : (a)

75. Value of the integral $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$ is :

a) 0 b) $\frac{1}{2}$ c) 1 d) 2

Ans : (c)

76. The value of cos 1° and cos 2° cos° .... cos 179° is :

a) $\frac{1}{\sqrt{2}}$ b) 0 c) 1 d) None of these

Ans : (b)

77. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, Then $A^2 + 2A$ is equal :

a) A b) 2A c) 3A d) 4A

Ans : (c)

78. In how many ways can 12 balls be divided between 2 boys, one receiving 5 and other 7 balls ?

a) 1080 b) 1184 c) 1584 d) None of these

Ans : (c)

79. The locus of the mid point of chords of the circle $x^2 + y^2 = 4$ which subtend a right angle at the centre, is :

a) x + y = 2 b) $x^2 + y^2 = 1$ c) $x^2 + y^2 = 2$ d) x + y = 1

Ans : (c)

80. The value of $\Delta^n O^n$ is equal to :

a) 0 b) n c) (n – 1) d) $\lfloor n$

Ans : (d)

81. The value of the integral $\int_0^{\frac{\pi}{2}} \sin^6 x\,dx$ is :

a) $\frac{3}{4}\pi$ b) $\frac{5}{32}\pi$ c) $\frac{3}{16}\pi$ d) None of these

Ans : (b)

82. The sum of the coefficient in the expansion of $(1 + x - 3x^2)^{2163}$ is :

a) – 1 b) 1 c) 2 d) 5

Ans : (a)

83. If H be Harmonic mean between a and b, then the value of $\frac{1}{H-a}+\frac{1}{H-b}$ is :

a) $\frac{1}{a}-\frac{1}{b}$ b) a – b c) a + b d) $\frac{1}{a}+\frac{1}{b}$

Ans : (d)

84. $\int_0^{\frac{\pi}{2}} \log \tan x\,dx$ is :

a) $\frac{\pi}{2}$ b) $-\frac{\pi}{2}$ c) 0 d) None

Ans : (c)

85. If $A=\begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$, Then A^2 is equal to :

a) $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$

Ans : (b)

86. If $\begin{vmatrix} x+a & a^2 & a^3 \\ x+b & b^2 & b^3 \\ x+c & c^2 & c^3 \end{vmatrix} = 0$, and a, b, c are distinct than x is equal to :

a) $\frac{abc}{\sum ab}$ b) $\frac{-abc}{\sum ab}$ c) $\frac{\sum ab}{abc}$ d) $\frac{-\sum ab}{abc}$

Ans : (b)

87. The value of ${}^nP_r$ is equal to :

a) $\lfloor \frac{n}{r}$ b) $\frac{\lfloor n}{\lfloor (n-r)}$ c) $\frac{n}{\lfloor (n-r)}$ d) None of these

Ans : (b)

88. If $A = [a_{ij}]_{2\times 2}$, where $a_{ij} = \begin{cases} i+j & \text{if } j \neq i \\ i^2 - 2j & \text{if } i = j \end{cases}$ Then A^{-1} is equal to :

a) $\frac{1}{9}\begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$ b) $\frac{1}{9}\begin{bmatrix} 0 & -3 \\ -3 & -1 \end{bmatrix}$

c) $\frac{1}{9}\begin{bmatrix} 0 & 3 \\ 3 & 1 \end{bmatrix}$ d) None of these

Ans : (c)

89. The value of $\int_{-1}^{1} |x+1|\,dx$ is :

a) 1 b) 0 c) 2 d) None of these

Ans : (c)

90. If ω is cube root of unity then $(1 + \omega - \omega^2)^7$ equal to :

a) 128ω b) -128ω c) $128\omega^2$ d) $-128\omega^2$

Ans : (d)

91. If $\frac{dy}{dx} = \sec y$, then :

a) $x = \sin y + c$ b) $x = \cos y + c$

c) $x = -\sin y + c$ d) None

Ans : (a)

92. A variable circle passes through a fixed point A(q, q) and touches x-axis. The locus of the other end of the diameter of this circle passing through A will be :

a) $(x-p)^2 = 4qx$ b) $(x-q)^2 = 4py$

c) $(x-p)^2 = 4qy$ d) $(y-q)^2 = 4px$

Ans : (c)

93. The harmonic mean of the roots of the equations $\left(5+\sqrt{2}\right)x^2 - \left(4+\sqrt{5}\right)x + \left(8+x\sqrt{5}\right) = 0$ is :

a) 2 b) 4 c) 6 d) 8

Ans : (b)

94. If $\lambda x^2 - 5xy + 6y^2 + x - 3y = 0$ represents a pair of straight lines, then their point of intersection is :

a) (1, 3) b) (–1, –3) c) (3, 1) d) (– 3, – 1)

Ans : (d)

95. The greatest term in the expansion of $\sqrt{3}\left(1+\frac{1}{\sqrt{3}}\right)^{20}$ is :

a) $\frac{25840}{9}$ b) $\frac{24840}{9}$ c) $\frac{26840}{9}$ d) None of these

Ans : (a)

96. If three circles are such that each intersect the remaining two, then their radical axes :

a) from a triangle b) are coincident
c) are concurrent d) are parallel

Ans : (c)

97. The value of cot $22\frac{1^\circ}{2}$ is equal to :

a) $1+\frac{1}{\sqrt{2}}$ b) $1+\sqrt{2}$ c) $\sqrt{2}-1$ d) None of these

Ans : (b)

98. $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$ is :

a) $\frac{\pi}{4}$ b) $-\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) None of these

Ans : (a)

99. The coefficient of x^n in the expansion of $(1 - 9x + 20x^2)^{-1}$ is :

a) $5^n - 4^n$ b) $5^{n+1} - 4^{n+1}$ c) $5^{n-1} - 4^{n-1}$ d) None of these

Ans : (b)

100. The value of $\int_0^3 [x] dx$ is :

a) – 3 b) 3 c) 2 d) 1

Ans : (b)