MATHS

BOOKS - ACCURATE PUBLICATION

SAMPLE QUESTION PAPER-I

Section A

1. Choose the correct option in the question :

The relation R in the $\{1, 2, 3\}$ given by $R = \{(1, 3), (3, 2), (1, 2)\}$ is

A. Transitive

B. Reflexive

C. Symmetric

D. Transitive and symmetric

Answer: B

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2. Choose the correct option in the question :

Value of $\sin\left[2\cos^{-1}\left(-\frac{3}{5}\right)\right]$ is

A. $\frac{12}{25}$

B. $\frac{13}{25}$

C. $-\frac{24}{25}$

D. $\frac{24}{25}$

Answer: C

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3. Choose the correct option in the question :

If $\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3z+w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$, then (x + y) is

A. 1

B. 2

C. 3

D. 4

Answer: C

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4. Choose the correct option in the question :

If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$, then A^2

A. I

B. 2I

C. I

D. 4I

Answer: A

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5. Choose the correct option in the question :

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

A. 1

B. 0

C. 2

D. 3

Answer: B

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6. Choose the correct option in the question :

If $f(x) = x^2 - 1, x \neq 1$ then f is continuous at $x = 1$if $f(1)$ is

A. 1

B. 2

C. 3

D. 4

Answer: B

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7. The derivative of $f(x) = |x|atx = 2$ equals :

A. 1

B. -1

C. 0

D. 2

Answer: A

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8. Choose the correct option in the question :

$\frac{d}{dx}\left[\cot^{-1}\left(\frac{1-x}{1+x}\right)\right] w.r.t.$ x is

A. x^2

B. $\frac{1}{x^2}$

C. $\frac{2}{1+x^2}$

D. $\frac{1}{1+x^2}$

Answer: D

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9. $\int \frac{dx}{\left(\sqrt{9x-4x^2}\right)}$ equals :

A. $\frac{1}{9}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

B. $\frac{1}{2}\sin^{-1}\left(\frac{8x-9}{9}\right)+C$

C. $\frac{1}{3}\sin^{-1}\left(\frac{9x-8}{8}\right)+C$

D. $\frac{1}{2}\sin^{-1}\left(\frac{9x-8}{9}\right)+C$

Answer: B

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10. Choose the correct option in the question :

$\int_0^1 \frac{x}{x^2+1}dx$ equals

A. log 2

B. 2 log 2

C. $\frac{1}{2}\log 2$

D. $\frac{1}{3}\log 2$

Answer: C

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11. Choose the correct option in the question :

Solution of $\frac{dy}{dx} = \frac{3x^2}{1+y^2}$ is

A. $y + y^2 = x^3 + c$

B. $y + y^3 = x^3 + c$

C. $y + y^3 = x^2 + c$

D. $y + y^2 = x^2 + c$

Answer: B

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12. The general solution of the differential equation $\frac{ydx - xdy}{y} = 0$ is:

A. $xy = C$

B. $x = Cy^2$

C. $y = Cx$

D. $y = Cx^2$

Answer: C

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13. Choose the correct option in the question :

If $\left|\vec{a}\right| = \sqrt{3}, \left|\vec{b}\right| = 2$ and $\vec{a}.\vec{b} = 3,$ then the angle between $\vec{a}$ and $\vec{b}$ is

A. 15°

B. 30°

C. 45°

D. 60°

Answer: B

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14. Choose the correct option in the question :

The projection of $\vec{a} = 2\hat{i} - 2\hat{j} - \hat{k}$ on $\vec{b} = 3\hat{i} - \hat{j} + 2\hat{k}$ is equal to

A. $\frac{5\sqrt{6}}{3}$

B. $\frac{6}{\sqrt{14}}$

C. $\frac{\sqrt{6}}{14}$

D. $\frac{5}{\sqrt{6}}$

Answer: B

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15. Distance between plane defined by 3y + 4z + 10 = 0 and the point (7, 5, 0) is :

A. 3 units

B. 4 units

C. 5 units

D. 6 units

Answer: C

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16. If $P(A/B) = \frac{2}{5}, 2P(A) = P(B) = \frac{5}{9}$, find

(i) $P(A \cap B)$

(ii) $P(A \cup B)$

A. $\frac{1}{9}$

B. $\frac{2}{9}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

Answer: B

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17. Let R be the relation in the set N given by $R = \{(a, b) : a = b - 2, b > 6\}$. Then $(6, 8) \in$ .....

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18. If A and B are symmetric then that $AB + BA$ is .....

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19. Derivative of $\sin^{-1}\left(2x\sqrt{1-x^2}\right), \ -\frac{1}{\sqrt{2}} < x < \frac{1}{\sqrt{2}}$ w.r.t.x is .....

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20. Two positive numbers whose sum is 16 and sum of whose cubes is minimum are.....

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21. $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$ equals :

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22. I.F of $x\frac{dy}{dx} + 4y = \frac{\log x}{x^4}$ is .....

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23. The equation of the plane with intercepts 2,3 and 4 on the x,y and z-axis respectively is .....

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24. If E, F are events of sample space S, then $P(E \mid F) = 1 - \ldots\ldots$.

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25. State rue of false for the followng statements :

$\sin^{-1}\left(2x\sqrt{1-x^2}\right) = \cos^{-1}x, \frac{1}{\sqrt{2}} \leq x \leq 1$

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26. State true of false for the followng statements :

If a matrix A is symmetric as well as skew symmetric, then A = O.

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27. State true of false for the followng statements :

$\frac{d}{dx}\left(\sin x^2\right) = 2x\cos x.$

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28. $\int e^x(f(x)+f'(x))dx$ is equal to :

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29. State true or false for the following statements :

A vector in the direction of $\vec{a} = 2\hat{i} - \hat{j} + 2\hat{k}$, which has magnitude of 6 units is $4\hat{i} - 2\hat{j} + 4\hat{k}$.

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30. The distance of a point P(a,b,c) from x axis is:

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31. State true or false for the following statements :

The random variable X has probability distribution P(X) of the following form, where k is some number:

$$P(X) = \begin{cases} k, & \text{if } x = 0 \\ 2k, & \text{if } x = 1 \\ 3k, & \text{if } x = 2 \\ 0, & \text{otherwise} \end{cases}$$ Then k = 6

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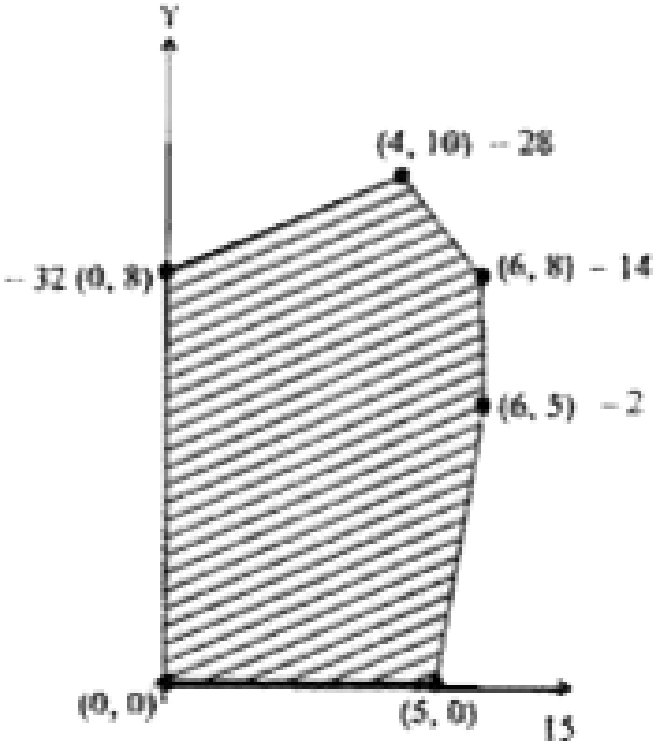
32. State true of false for the followng statements :

The fesible solution for a LPP is shown in Let Z =3 x - 4 y be the objective function. Maximum of Z occurs at (0,8)



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Section B

1. Write the number of all possible matrixes of order 2×2 with each entry 1,2 or 3.

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2. For what value of 'a' if the matrix $\begin{bmatrix} 4 & -3 & -1 \\ 2 & a & 6 \\ 3 & -5 & -4 \end{bmatrix}$ singular ?

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3. Find the points on the curve $y = x^3$ at which the slope of the tangent is equal to the y-coordinate of the point.

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4. Find the values of 'a for which the function : $f(x) = x^2 - 2ax + 6$ is increasing when x > 0

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5. Find $\int \frac{3x}{3x-1} dx$.

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6. Find the area of the region bounded by the curve $y^2 = 4x$ and the line $x = 3$.

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7. Show that the points $A\left(-2\hat{i}+3\hat{j}+5\hat{k}\right), B\left(\hat{i}+2\hat{j}+3\hat{k}\right)$ and $C\left(7\hat{i}-\hat{k}\right)$ are collinear.

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8. Show that the vectors : $2\hat{i}-\hat{j}+\hat{k}, \hat{i}-3\hat{j}-5\hat{k}$ and $3\hat{i}-4\hat{j}-4\hat{k}$ form the vertices of a right angled triangle.

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Section C

1. Prove the following: $\cos\left[\tan^{-1}\left\{\sin\left(\cot^{-1}x\right)\right\}\right]=\sqrt{\frac{1+x^2}{2+x^2}}$

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2. Express $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right),\ -\frac{\pi}{2}<x<\frac{\pi}{2}$ in the simplest form.

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3. If $x\sqrt{1+y}+y\sqrt{1+x}=0$ show that $\frac{dy}{dx}=-\frac{1}{(1+x)^2}$

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4. Evaluate $\int \frac{6x+7}{\sqrt{(x-5)(x-4)}} dx.$

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5. Show that $\int_{-1}^{2} |x^3 - x| dx = \frac{11}{4}.$

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6. Solve $\sqrt{1+x^2+y^2+x^2y^2} + xy\frac{dy}{dx} = 0$

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7. If A and B are two independent events such that : $P(\overline{A} \cap B) = \frac{2}{15}$ and $P(A \cap \overline{B}) = \frac{1}{6}$, then find $P(A)$ and $P(B)$.

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8. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of aces.

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Section D

1. Given that $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$. Find AB.

Use this to solve the following system of equations:

x-y+z=4,x-2y-2z=9,2x+y+3z=1.

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2. Using properties of determinants, prove that:

$$\begin{vmatrix} x & x^2 & 1+px^3 \\ y & y^2 & 1+py^3 \\ z & z^2 & 1+pz^3 \end{vmatrix} = (1+pxyz)(x-y)(y-z)(z-x)$$

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3. Find the shortest distance between the following lines whose vector equations are :

$\vec{r} = \left(4\hat{i} - \hat{j}\right) + \lambda\left(\hat{i} + 2\hat{j} - 3\hat{k}\right)$ and $\vec{r} = \left(\hat{i} - \hat{j} + 2\hat{k}\right) + \mu\left(2\hat{i} + 4\hat{j} -$

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4. Find the equation of the plane through the line of intersection of the planes given by the equations x + y + z = 1 and 2x + 3y + 4z = 5 which is perpendicular to the plane given by the equation x - y + z = 0.

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5. Solve the following linear programming problem graphically. Maximize the objective function $Z = 9x + 10y$ subject to the constraints $x + 2y \leq 6, x + y \leq 5, x \geq 3, x \geq 0, y \geq 0.$

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6. Graphically minimize and maximize $z = 3x + 4y$ subject to the constraints: $x + y \leq 40x + 2y \leq 80, x - 2y \geq -20x, y \geq 0.$

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Section A 1 Choose The Correct Option In The Following Questions

1. Function 'f:RrarrR,f(x)=3x-5' is :

A. One-one only

B. Onto only

C. One-one and onto

D. None of these

Answer: C

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2. Relation given by $R = \{(1, 1), (2, 2), (1, 2), (2, 1)\}$ in the set $A = \{1, 2\}$ is :

A. Reflexive only

B. Symmetric only

C. Transitive only

D. Equivalence relation

Answer: D

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3. $\cos^{-1}\left(-\cos\frac{2\pi}{3}\right)$ is equal to :

A. $\frac{\pi}{5}$

B. $\frac{2\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{3}$

Answer: D

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4. If $\begin{bmatrix} 1 & -x \\ 4 & -4 \end{bmatrix} = \begin{bmatrix} 1 & 8 \\ 4 & -4 \end{bmatrix}$, then value of x is :

A. 8

B. -4

C. 3

D. -8

Answer: D

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5. If order of matrix A is 2×3 and order of matrix B is 3×5 then order of matrix B'A' is :

A. 5×2

B. 2×5

C. 5×3

D. 3×2

Answer: A

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6. If 'f(x)= {[Kx+1,xle5],[3x-5,x>5]:}' is continuous at x=5 then value of k is :

A. $\frac{9}{5}$

B. $\frac{5}{9}$

C. $\frac{5}{3}$

D. $\frac{3}{5}$

Answer: A

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7. $\frac{d}{dx}\left\{\tan^{-1}(e^x)\right\}$ is equal to :

A. $e^x \tan^{-1} e^x$

B. $\frac{e^x}{1+e^{2x}}$

C. 0

D. $e^x \sec^{-1} x$

Answer: B

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8. Slope of tangent to the curve 'y = x^2-2x+1' at x=3 is :

A. 4

B. 6

C. 0

D. 2

Answer: A

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9. $\int 3x^2 dx$ is equal to :

A. $x + c$

B. $x^2 + c$

C. $x^3 + c$

D. $x^4 + c$

Answer: C

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

A. 0

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{4}$

Answer: D

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11. Degree of differential equation $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 3y = 0$ is :

A. 3

B. 2

C. 1

D. 0

Answer: C

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12. If $\vec{a} \cdot \vec{b} = \left|\vec{a} \times \vec{b}\right|$, then angle between vector $\vec{a}$ and vector $\vec{b}$ is :

A. $\frac{\pi}{2}$

B. $\frac{\pi}{6}$

C. $\frac{\pi}{4}$

D. $\frac{\pi}{3}$

Answer: C

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13. If $\vec{a} . \vec{b} = 0$ then angle between vector veca and vecb is:

A. $\frac{\pi}{2}$

B. $\frac{\pi}{6}$

C. $\frac{\pi}{4}$

D. $\frac{\pi}{3}$

Answer: A

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14. Direction ratios of line given by line $\frac{x-1}{3} = \frac{2y+6}{12} = \frac{1-z}{-7}$ are :

A. $< 3, 12, -7 >$

B. $< 3, -6, 7 >$

C. $< 3, 6, 7 >$

D. $< 3, 6, -7 >$

Answer: C

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15. Maximum value of $Z = 3x + y$ for the constraints $x + y \leq 4, x \geq 0,$ $y \geq 0$ is :

A. 12

B. 16

C. 4

D. 10

Answer: A::B

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16. If $P(A) = \frac{1}{2}, P(B) = \frac{3}{8}$ and $P(A \cap B) = \frac{1}{5}$. then P(A/B) is equal to :

A. $\frac{2}{5}$

B. $\frac{8}{15}$

C. $\frac{2}{3}$

D. $\frac{5}{8}$

Answer: B

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Section A 2 Fill In The Blanks From The Given Options

1. Value of sin^-1(1) is

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2. If $A = [a_{ij}]_{2 \times 3}$ such that $a_{ij} = i + j$ then a 11=

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3. If $\begin{vmatrix} x & 0 \\ 7 & 1 \end{vmatrix} = \begin{vmatrix} 3 & 0 \\ 7 & 1 \end{vmatrix}$ then x=

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4. If 'y=cos x ' then at'x=0', 'dy/dx=.....'.

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5. $\int_0^5 dx = \ldots\ldots\ldots\ldots$

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6. Order of the differential equation $\frac{d^2y}{dx^2} - \left(\frac{dy}{dx}\right)^3 + y = 0$ is .....

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7. Direction ratios of a line which is perpendicular to the plane '3x-y+2z=9' are ..... .

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8. The probability of an impossible event is

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Section A 3 State True Or False For The Following Statements

1. If A is any square matrix then A + A' is a :

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2. If $y = 10x$ then $\frac{dy}{dx} = 10.$

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3. If $y = \tan x$ then $\frac{dy}{dx} = \sec^2 x$

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4. $\int dx = x + c$

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5. $xdy - ydx = 0$ is a variable separable type of differential equation.

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6. Scalar product of two perpendicular vectors is zero.

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7. Point $(3, -4, 2)$ lies in the plane $2x + y - z = 0$.

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8. If P (E) = 0.4 then P (not E) = 0.6

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Section B

1. If $A = \begin{bmatrix} -2 & 4 \\ -1 & 3 \end{bmatrix}$, then find A'A.

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2. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 2 \end{bmatrix}$ and $f(x) = x^2 - 2x + 3$, then find f(A).

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3. Find the equation of the tangent to the curve $y = 2x^2 + 3\sin x$ at x = 0.

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4. Show that the function f given by $f(x) = x^3 - 3x^2 + 4x, x \in R$ is strictly increasing on R.

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5. Evaluate : $\int \sin 5x \sin 3x dx.$

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6. Using integration, find the area of the region bounded by the curve $x^2 + y^2 = 16$ in the first quadrant.

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7. Find a vector in direction of vector $4\hat{i} - \hat{j} + 3\hat{k}$ which has magnitude 7 units.

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8. If $\vec{a}+\vec{b}+\vec{c}=0$ and $\left|\vec{a}\right|=3, \left|\vec{b}\right|=5, \left|\vec{c}\right|=7$, find the angle between $\vec{a}$ and $\vec{b}$.

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9. Using prperties of determinants, prove that :

$$\begin{vmatrix} 1 & 1 & 1+3x \\ 1+3y & 1 & 1 \\ 1 & 1+3z & 1 \end{vmatrix} = 9(3xyz+xy+yz+zx).$$

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10. If $\begin{bmatrix} 2x+y & 3y \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 6 & 4 \end{bmatrix}$ then find x

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11. Find for which values of 'x', the functions: $y=x^4-\frac{4x^3}{3}$ is increasing and for which values, it is decreasing.

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12. Find the equation of the tangent at $t = \frac{\pi}{4}$ to the curve: x = sin 3t, y = cos 2t.

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13. Find : $\int \sin^{-1}(2x)dx.$

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14. Find the area of the region bounded by ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1.$

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15. Find the magnitude of each of the two vectors $\vec{a}$ and $\vec{b}$, having the same magnitude such that the angle between them in 60° and their

scalar product is $\frac{9}{2}$.

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16. Find the sine of the angle between the vectors $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = 3\hat{i} + 4\hat{j} - \hat{k}$. Also find a unit vector perpendicular to both the vectors.

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17. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ and $f(x) = x^2 + 2x + 3$ then find $f(A)$.

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18. Find the interval in which function $f(x) = x^2 + 2x - 7$ is increasing.

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19. Find the slope of the normal to the curve $y = x^3 - x + 1$ at the point whose x-coordinate is 2.

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20. Integrate $\int e^x \left(\log x + \frac{1}{x} \right) dx.$

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21. Evaluate : $\int x \sin x dx.$

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22. Using integration find the area bounded by the parabola $y^2 = 4x$ straight lines $x = 1, x = 4$ in the first quadrant.

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23. Find the unit vector in the direction of diagonal of the parallelogram whose sides are given by the vector $\vec{a} = 2\hat{i} - \hat{j} - 3\hat{k}, \vec{b} = 5\hat{i} + 2\hat{j} - \hat{k}$

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24. If $\vec{a} = 2\hat{i} + 3\hat{j} - 5\hat{k}, \vec{b} = 7\hat{i} - 2\hat{j} - 4\hat{k}$ then find $\vec{a} \times \vec{b}$

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25. If $A = \begin{bmatrix} -2 & 4 \\ -1 & 3 \end{bmatrix}$, then find A'A.

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26. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 2 \end{bmatrix}$ and $f(x) = x^2 - 2x + 3$, then find f(A).

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27. Find the equation of the tangent to the curve $y = 2x^2 + 3\sin x$ at x = 0.

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28. Show that the function f given by $f(x) = x^3 - 3x^2 + 4x, x \in R$ is strictly increasing on R.

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29. Evaluate : $\int \sin 5x \sin 3x dx.$

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30. Using integration, find the area of the region bounded by the curve $x^2 + y^2 = 16$ in the first quadrant.

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31. Find a vector in direction of vector $4\hat{i} - \hat{j} + 3\hat{k}$ which has magnitude 7 units.

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32. If $\vec{a} + \vec{b} + \vec{c} = 0$ and $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 5, \left|\vec{c}\right| = 7$, find the angle between $\vec{a}$ and $\vec{b}$.

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Section C

1. Show that $\sin^{-1}\left(\frac{12}{13}\right) + \cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{63}{16}\right) = \pi$

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2. Differentiate : $x^{\sin x} + (\sin x)^x w.r.tx$:

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3. If $y = e^{\tan^{-1} x}$, then prove that $\left(1 + x^2\right) y_2 + (2x - 1) y_1 = 0$

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4. Evaluate : $\int \frac{(x-4)e^x}{(x-2)^3} dx.$

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5. Evaluate : $\int \frac{1}{(x-1)(x+2)(x-3)} dx.$

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6. Solve the differential equation:

$$\left[\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}}\right]\frac{dx}{dy} = 1, (x \neq 0)$$

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7. An insurance company insured 3000 scooters, 4000 cars and 5000 trucks. The probabilities of an accident involving a scooter, a car and a truck are 0.02, 0.03, 0.04 respectively. One of the insured vehicles meets with an accident. Find the probability that it is a car.

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8. The probability of getting an ace froma well shuffled deck of 52 playing cards.

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9. Simplify : $\cot^{-1}\left(\sqrt{1+x^2}-x\right)$.

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10. If $y = x^{\tan x} + (\tan x)^x$ then find $\frac{dy}{dx}$.

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11. If sin y = x sin (a + y), then prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$.

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12. Show that : $\int_0^{\pi} \frac{x}{1+\sin x} dx = \pi$.

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13. Solve the following differential equations

$$\left(x \sin \frac{y}{x}\right) dy = \left(y \sin \frac{y}{x} - x\right) dx$$

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14. Solve : $\frac{dy}{dx} + y \sec x = \tan x.$

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15. From a lot of 20 bulbs which include 5 defectives, a sample of 3 bulbs is drawn at random one by one with replacement. Find the probability distribution of the number of defective bulbs. Also, find the mean of the distribution.

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16. Find the value of :

$$2\tan^{-1}(1) - \cos^{-1}\left(\frac{-1}{2}\right) + 3\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) + 2\sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$$

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17. If $y = x^{\sin x} + (\sin x)^x$ then find $\frac{dy}{dx}$.

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18. If $y = \left[\tan^{-1} x\right]^2$, then prove that : $\left(x^2+1\right)^2 y_2 + 2x\left(x^2+1\right)y_1 = 2$.

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19. Evaluate $\int \frac{3x-1}{(x-1)(x-2)(x-3)}dx$

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20. Evaluate : $\int \frac{\sec^2 x}{\tan^2 x - 4\tan x + 7} dx.$

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21. Find the particular solution of differential equation : $x^2 dy - \left(x^2 + xy + y^2\right) dx = 0, y(1) = 1.$

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22. Find the general solution of differential equation : $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$

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23. Bag I contains 3 red and 4 black balls, Bag II contains 5 red and 6 black balls. One bag is chosen at random and a ball is drawn which is found to be red. Find the probability that it was drawn from Bag I.

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24. Show that $\sin^{-1}\left(\frac{12}{13}\right)+\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{63}{16}\right)=\pi$

Watch Video Solution

25. Differentiate : $x^{\sin x}+(\sin x)^{x} w.\ r.\ tx$:

Watch Video Solution

26. If $y=e^{\tan^{-1}x}$, then prove that $\left(1+x^{2}\right)y_{2}+(2x-1)y_{1}=0$

Watch Video Solution

27. Evaluate : $\int\frac{(x-4)e^{x}}{(x-2)^{3}}dx.$

Watch Video Solution

28. Evaluate : $\int \frac{1}{(x-1)(x+2)(x-3)} dx.$

Watch Video Solution

29. Solve the differential equation:

$$\left[\frac{e^{-2\sqrt{x}}}{\sqrt{x}} - \frac{y}{\sqrt{x}}\right]\frac{dx}{dy} = 1, (x \neq 0)$$

Watch Video Solution

30. An insurance company insured 3000 scooters, 4000 cars and 5000 trucks. The probabilities of an accident involving a scooter, a car and a truck are 0.02, 0.03, 0.04 respectively. One of the insured vehicles meets with an accident. Find the probability that it is a car.

Watch Video Solution

31. Find the probability distribution of number of aces, when two cards are drawn (with replacement) at random from a well-shuffled pack of 52

cards.

Watch Video Solution

Section D

1. Using matrix method, solve the following system of equations

$x + 2y - 3z = 1, 2x - 3z = 2, x + 2y = 3.$

Watch Video Solution

2. If $A = \begin{bmatrix} 3 & 4 & 2 \\ 2 & 3 & 5 \\ 1 & 0 & 1 \end{bmatrix}$ find A^{-1} and hence solve the equations

$3x + 4y + 2z = -1, 2x + 3y + 5z = 7, x + z = 2.$

Watch Video Solution

3. Find the equation of the plane passing through the line of intersection of the planes $2x + y - z = 3$ and $5x - 3y + 4z = 9$ and parallel to the lines $\frac{x-1}{2} = \frac{y-3}{4} = \frac{z-5}{5}$

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4. Find the shortest distance between the lines given by

$\vec{r} = 3\hat{i} + 8\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} - \hat{j} + \hat{k}\right)$ and

$\vec{r} = -3\hat{i} - 7\hat{j} + 6\hat{k} + \mu\left(-3\hat{i} + 2\hat{j} + 4\hat{k}\right).$

Watch Video Solution

5. Graphically maximize Z = 5x + 2y subject to the constraints :

$x - 2y \leq 2, 3x + 2y \leq 12, -3x + 2y \leq 3, x \geq 0, y \geq 0$

Watch Video Solution

6. Solve the following L.P.P graphically :

Maximise Z = 20x + 10y

subject to the costraints

$x + 2y \leq 28$

$3x + y \leq 24$

$x \geq 2$

$x, y \geq 0$

Watch Video Solution

7. Solve the following system of linear equations by matrix method :

$2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

Watch Video Solution

8. If $A = \begin{bmatrix} 2 & 2 \\ -2 & 1 \end{bmatrix}$, Find A^{-1}.

Watch Video Solution

9. Find the distance of the point $(-1, -5, -10)$ from the point of intersection of the line $\vec{r} = 2\hat{i} - \hat{j} + 2\hat{k} + \lambda\left(3\hat{i} + 4\hat{j} + 2\hat{k}\right)$ and the plane $\vec{r} \cdot \left(\hat{i} - \hat{j} + \hat{k}\right) = 5$

Watch Video Solution

10. Find the equations of the plane through the line of intersection of $\vec{r}.\left(2\hat{i} - 3\hat{j} + 4\hat{k}\right) = 1$ and $\vec{r}.\left(\hat{i} - \hat{j}\right) + 4 = 0$ and perpendicular to the plane $\vec{r}.\left(2\hat{i} - \hat{j} + \hat{k}\right) + 8 = 0$. Hence find whether the plane thus obtained contains the line x - 1 = 2y - 4 = 3z - 12.

Watch Video Solution

11. Solve the following linear programming problem graphically:

Miximise $Z = 5x + 3y$ subject to the constraints :

$3x + 5y \leq 15$

$5x + 2y \leq 10$

$x \geq 0, y \geq 0$

Watch Video Solution

12. Solve the following linear programming problem graphically:

Miximise $Z = x + 2y$ subject to the constraints :

$x + 2y \geq 100$

$2x - y \leq 0$

$2x + y \leq 200$

$x \geq 0, y \geq 0$

Watch Video Solution

13. Solve the following system of linear equations by matrix method :

$2x + 3y - z = 6, 5x - 3y + z = 8, 7x + y + 3z = 8$

Watch Video Solution

14. Express $A = \begin{bmatrix} 2 & 3 & 5 \\ 0 & 2 & 9 \\ 3 & 2 & 8 \end{bmatrix}$ as the sum of a symmetric matrix and a skew-symmetric matrix.

Watch Video Solution

15. Find the shortest distance between the lines $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - 3\hat{j} + 2\hat{k}\right)$ and $\vec{r} = 4\hat{i} + 5\hat{j} + 6\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + \hat{k}\right)$

Watch Video Solution

16. Find the foot of perpendicular drawn from the point $(2, -3, 5)$ on the plane $3x + 4y - 2z = 20$.

Watch Video Solution

17. Solve the following linear programming problem graphically :

Maximize and minimize $Z = 4x + 3y$ subject to the constraints

$x + y \leq 8, 4x + y \geq 8, x - y \geq 0, x \geq 0, y \geq 0$

Watch Video Solution

18. Solve the following linear programming problem graphically :

Maximize and minimize $Z = 5x + 2y - 2$ subject to the constraints

$x + y \leq 10, x + y \geq 3, x \leq 8, y \leq 8, x \geq 0, y \geq 0$

Watch Video Solution

19. Using matrix method, solve the following system of equations

$x + 2y - 3z = 1, 2x - 3z = 2, x + 2y = 3.$

Watch Video Solution

20. If $A = \begin{bmatrix} 3 & 4 & 2 \\ 2 & 3 & 5 \\ 1 & 0 & 1 \end{bmatrix}$ find A^{-1} and hence solve the equations $3x + 4y + 2z = -1, 2x + 3y + 5z = 7, x + z = 2.$

Watch Video Solution

21. Find the equation of the plane passing through the line of intersection of the planes $2x + y - z = 3$ and $5x - 3y + 4z + 9 = 0$ and parallel to the line $\frac{x-1}{2} = \frac{y-3}{4} = \frac{5-z}{-5}$

Watch Video Solution

22. Find the shortest distance between the lines given by

$\vec{r} = 3\hat{i} + 8\hat{j} + 3\hat{k} + \lambda\left(3\hat{i} - \hat{j} + \hat{k}\right)$ and

$\vec{r} = -3\hat{i} - 7\hat{j} + 6\hat{k} + \mu\left(-3\hat{i} + 2\hat{j} + 4\hat{k}\right).$

Watch Video Solution

23. Graphically maximize Z = 5x + 2y subject to the constraints :

$x - 2y \leq 2, 3x + 2y \leq 12, \ -3x + 2y \leq 3, x \geq 0, y \geq 0$

Watch Video Solution

24. Solve the following L.P.P graphically :

Maximise Z = 20x + 10y

subject to the costraints

$x + 2y \leq 28$

$3x + y \leq 24$

$x \geq 2$

$x, y \geq 0$

Watch Video Solution

Section A

1. If $A = \{a, b, c, d\}$ then a relation $R = \{(a, a), (b, b), (c, c), (d, d)\}$ on A is :

A. Symmetric

B. Transitive

C. Reflexive

D. None of these

Answer: C

Watch Video Solution

2. The value of $\text{cosec}^{-1}(-2)$ is equal to :

A. $\frac{\pi}{3}$

B. $-\frac{\pi}{6}$

C. $-\frac{\pi}{3}$

D. $\frac{\pi}{6}$

Answer: B

Watch Video Solution

3. If AB = C where A is a matrix of order 2×4 and C is a matrix of order 2×5, then the order of B is :

A. 3×5

B. 4×5

C. 3×3

D. 5×5

Answer: B

Watch Video Solution

4. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

A. 27

B. 18

C. 81

D. 512

Answer: D

Watch Video Solution

5. If $A = [[321]]$, then AA' is equal to :

A. $\begin{pmatrix} 9 & 4 & 1 \end{pmatrix}$

B. $\begin{pmatrix} 9 \\ 4 \\ 1 \end{pmatrix}$

C. -14

D. -6

Answer: C

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Watch Video Solution

6. If $f(x) = \begin{cases} \frac{\sin 5x}{2x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at x = 0 then value of k is :

A. 5

B. $\frac{3}{5}$

C. $\frac{5}{3}$

D. 0

Answer: B

Watch Video Solution

7. If $y = 3^x$, then $\frac{dy}{dx}$ is :

A. 3^x

B. $3^x \log 3$

C. 3

D. $\frac{3^x}{\log 3}$

Answer: B

Watch Video Solution

8. If $y = \tan x$ then at $x = 0$, y_2 is equal to :

A. -1

B. 1

C. 0

D. $\frac{1}{2}$

Answer: C

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9. $\int \frac{\sin x}{\cos^2 x} dx$ equals :

A. sec x + c

B. tan x + c

C. cosec x + c

D. $\sec^2 x + c$

Answer: A

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10. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$ is equal to :

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

Watch Video Solution

11. The number of arbitrary constants in the particular solution of a differential equation of fifth order is :

A. 0

B. 2

C. 3

D. 5

Answer: A

Watch Video Solution

12. The Integrating Factor of the differentiate equation $\frac{dy}{dx} - 2y = 3x$ is :

A. e^{2x}

B. e^{-2x}

C. e^{x}

D. 2x

Answer: B

Watch Video Solution

13. If $\vec{a} = \hat{i} + 2\lambda\hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} - 3\hat{k}$ are perpendicular to each other, the value of λ is :

A. 0

B. 1

C. 2

D. $\frac{1}{2}$

Answer: D

Watch Video Solution

14. If θ is the angle between any two vectors $\vec{a}$ and $\vec{b}$, then $\left|\vec{a}.\vec{b}\right| = \left|\vec{a} \times \vec{b}\right|$ when θ is equal to :

A. 0

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: B

Watch Video Solution

15. The distance of the plane $\vec{r}.\left(2\hat{i} + 3\hat{j} - 6\hat{k}\right) = 7$ from origin is :

A. -1

B. 0

C. $\frac{1}{7}$

D. 1

Answer: D

Watch Video Solution

16. In a single throw of two dice, the chances of throwing a sum of 5 is :

A. 0

B. $\frac{1}{36}$

C. $\frac{1}{9}$

D. $\frac{5}{36}$

Answer: C

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17. If f is a bijection, then it is.....

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18. If |A| = 3. where A is a 2×2 matrix, |Adj A| = ...

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19. $\frac{d}{dx}\left(x^2+2x+5\right)^2$ = ...

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20. The slope of tangent to the curve $y = 2 - x^2$ at x = 1 is

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21. The value of $\int_{-\pi}^{\pi} \sin^{2019} x \cos^{2020} x dx$ is equal to.....

Watch Video Solution

22. Degree of differential equation $\left(\frac{dy}{dx}\right)^3 + \frac{d^3y}{dx^3} = 5$ is .....

Watch Video Solution

23. The distance between the planes $3x + 2y - 6z - 18 = 0$ and $3x + 2y - 6z + 10 = 0$ is

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24. If A and B are mutually exclusive, then $P(A \cap B)$ is equal to _____.

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25. The value of the expressions $\left(\cos^{-1} x\right)^2$ is equal to $\sec^2 x$.

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26. $\left(A^3\right)^{-1} = \left(A^{-1}\right)^3$, where A is a square matrix and $|A| \neq 0$.

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27. Derivative of $\sin^{-1}(\cos x)$ w.r.t. x is 1

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28. *prove*: $\int \frac{\sin^2 x}{1+\cos x} dx = x + \sin x + c.$

Watch Video Solution

29. If $\vec{a} = \hat{i} + 4\hat{j} + 4\hat{k}$ and $\vec{b} = 4\hat{i} - \hat{j} + 2\hat{k}$, then $\vec{a} . \vec{b}$ is equal to 8.

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30. If cos α , cos β , cos γ are the direction-cosines of a line, then the value of

$\cos^2\alpha + \cos^2\beta + \cos^2\gamma$ is _____ .

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31. Quadrant represented by the region $x \geq 0, y \geq 0$ is first.

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32. If A and B are two events such that $P(A) > 0$ and $P(A) + P(B) > 1$, then $\mathrm{P}(B \mid A) \geq 1 - \frac{P(B')}{P(A)}$.

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33. The relation R in R defined as $R = \{(a, b) : a \leq b\}$, is reflexive and transitive but not symmetric.

A. Reflexive and Symmetric

B. Symmetric and Transitive

C. Reflexive and Transitive

D. None of these

Answer: C

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34. $\tan^{-1}\sqrt{3} - \cot^{-1}(\sqrt{3})$ is equal to

A. $\frac{\pi}{6}$

B. $-\frac{\pi}{2}$

C. 0

D. $2\sqrt{3}$

Answer: B

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35. X, Z are matrices of order $2 \times n$, $2 \times p$ respectively.

If n = p, then the order of the matrix 7X - 5Z is :

A. $p \times 2$

B. $2 \times n$

C. $n \times 3$

D. $p \times n$

Answer: B

Watch Video Solution

36. Solution of $\begin{bmatrix} 2 & -3 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$ is given by

A. x = 2, y = 1

B. x = 1, y = 2

C. x = 2, y = 2

D. x = 2, y = 3

Answer: A

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37. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, then A + A' is

A. $\begin{pmatrix} 2 & 0 \\ 5 & 8 \end{pmatrix}$

B. $\begin{pmatrix} 2 & 5 \\ 5 & 8 \end{pmatrix}$

C. $\begin{pmatrix} 2 & 5 \\ 0 & 8 \end{pmatrix}$

D. $\begin{pmatrix} 1 & 5 \\ 5 & 4 \end{pmatrix}$

Answer: B

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38. The constant k, so that the $f(x) = \begin{cases} \frac{x^2-2x-3}{x+1} & \text{if } x \neq -1 \\ k & \text{if } x = -1 \end{cases}$ is continuous at x = -1 is

A. -1

B. -2

C. -4

D. -5

Answer: C

Watch Video Solution

39. Derivative of $\left(\sec^{-1} x + \text{cosec}^{-1} x\right)$ w.r.t. x is

A. -1

B. 0

C. 1

D. 2

Answer: B

Watch Video Solution

40. Differentiate $\tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$ w.r.t.x

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

Answer: B

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41. $\int \frac{10x^9 + 10^x \log_e 10}{x^{10} + 10^x}$ dx is equal to :

A. $10^x - x^{10} + C$

B. $10^x + x^{10} + C$

C. $\left(10^x - x^{10}\right)^{-1} + C$

D. $\log\left(10^x + x^{10}\right) + C$

Answer: D

Watch Video Solution

42. Evaluate the following integrals:

$$\int e^x \left(\tan^{-1} x + \frac{1}{1+x^2}\right) dx$$

A. $e^x + c$

B. $\tan^{-1} x + c$

C. e^(2x) tan^(-1) x + c`

D. $e^x \tan^{-1} x + c$

Answer: D

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43. Find the particular solution of $\log\left(\frac{dy}{dx}\right) = 2x + 3y$ given that $x = 0, y = 0$.

A. $-\frac{1}{3}e^{-3y} = \frac{1}{2}e^{2x} - \frac{5}{6}$

B. $-\frac{1}{2}e^{-3y} = \frac{1}{3}e^{2x} - \frac{5}{6}$

C. $-\frac{1}{3}e^{-3y} = \frac{1}{4}e^{2x} - \frac{5}{6}$

D. $-\frac{1}{4}e^{-3y} = \frac{1}{3}e^{2x} - \frac{5}{6}$

Answer: A

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44. The general solution of the differential equation $\frac{dy}{dx} = e^{x+y}$ is:

A. $e^x + e^{-y} = C$

B. $e^x + e^y = C$

C. $e^{-x} + e^{y} = C$

D. $e^{-x} + e^{-y} = C$

Answer: A

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45. If $\vec{a} = \hat{i} - \hat{j} + 7\hat{k}$ and $\vec{b} = 5\hat{i} - \hat{j} + \lambda\hat{k}$, then $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are perpendicular vectors when λ is

A. $\lambda = \pm 2$

B. $\lambda = \pm 3$

C. $\lambda = \pm 4$

D. $\lambda = \pm 5$

Answer: D

Watch Video Solution

46. Write the value of: $\left(\hat{i}.\left(\hat{j}\times\hat{k}\right)+\hat{j}\left(\hat{i}\times\hat{k}\right)+\hat{k}.\left(\hat{I}\times\hat{j}\right)\right.$

A. 1

B. -1

C. 3

D. 0

Answer: C

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47. The length of the perpendicular drawn from the origin to the plane 2x - 3y + 6z + 21 = 0.

A. 3

B. 4

C. 5

D. 2

Answer: A

Watch Video Solution

48. An urn contains 6 red and 4 blue balls. Two balls are drawn at random with replacement. The probability of getting 2 red balls is

A. $\frac{8}{25}$

B. $\frac{9}{25}$

C. $\frac{11}{25}$

D. $\frac{13}{25}$

Answer: B

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49. Range of the function $f(x) = \frac{|x-4|}{x-4}$ is.....

Watch Video Solution

50. A (adj A) = ...

Watch Video Solution

51. If $y = ae^{mx} + be^{-mx}$, then $\frac{d^2y}{dx^2} - m^2y$ = ...

Watch Video Solution

52. The function f(x) = 7x - 3 is a strictly.....function on R.

Watch Video Solution

53. $\int x^n \log x dx$ = ...

Watch Video Solution

54. I.F. of $x\frac{dy}{dx} + y = x\log x$ is .....

Watch Video Solution

55. A line makes angles of $45^\circ \text{ and } 60^\circ$ with the positive axes of x and y respectively. The line makes an angle.....with the positive axis of z.

Watch Video Solution

56. The events E and F are given to be independent. If it is given that P(E) = 0.35 and $P(E \cup F) = 0.60$, then P(F) = ...

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57. $\cos^{-1} x = (\cos x)^{-1}$

View Text Solution

58. $(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$

Watch Video Solution

59. $\frac{d}{dx}(x^x) = x(x^{x-1})$

Watch Video Solution

60. *prove*: $\int \frac{1}{(\log x)x} dx = \log(\log x) + c.$

Watch Video Solution

61. The vectors $\vec{a} = 3\hat{i} + x\hat{j}$ and $\vec{b} = 2\hat{i} + \hat{j} + y\hat{k}$ are mutually perpendicular. If $\left|\vec{a}\right| = \left|\vec{b}\right|$, then $y = \pm 2\sqrt{10}$.

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62. If a line makes angle $90^\circ, 135^\circ, 45^\circ$ with X,Y and Z-axis respectively, then its direction cosines are

Watch Video Solution

63. One card is drawn from a well-shuffled pack of 52 cards. E is the event "the card drawn is a king or queen" and F is the event " the card drawn is a queen or an ace ". Then find the probability of the conditional event E/F .

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64. The point which does not lie in the half-plane $3x + 7y - 32 \leq 0$ is

Watch Video Solution

65. If $A = \{a, b, c, d\}$ then a relation $R = \{(a, a), (b, b), (c, c), (d, d)\}$ on A is :

A. Symmetric

B. Transitive

C. Reflexive

D. None of these

Answer: C

Watch Video Solution

66. Principal value of `cosec^-1 (2) is :

A. $\frac{\pi}{3}$

B. $-\frac{\pi}{6}$

C. $-\frac{\pi}{3}$

D. $\frac{\pi}{6}$

Answer: B

Watch Video Solution

67. If AB = C where A is a matrix of order 2×3 and C is a matrix of order 2×5, then the order of B is :

A. 3×5

B. 4×5

C. 3×3

D. 5×5

Answer: B

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68. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

A. 27

B. 18

C. 81

D. 512

Answer: D

Watch Video Solution

69. If $A = [[321]]$, then AA' is equal to :

A. $\begin{pmatrix} 9 & 4 & 1 \end{pmatrix}$

B. $\begin{pmatrix} 9 \\ 4 \\ 1 \end{pmatrix}$

C. -14

D. -6

Answer: C

Watch Video Solution

Watch Video Solution

70. If $f(x) = \begin{cases} \frac{\sin 5x}{2x} & x \neq 0 \\ k & x = 0 \end{cases}$ is continuous at x = 0 then value of k is :

A. 5

B. $\frac{3}{5}$

C. $\frac{5}{3}$

D. 0

Answer: B

Watch Video Solution

71. If $y = 3^x$, then $\frac{dy}{dx}$ is :

A. 3^x

B. $3^x \log 3$

C. 3

D. $\frac{3^x}{\log 3}$

Answer: B

Watch Video Solution

72. If $y = \tan x$ then at $x = 0$, y_2 is equal to :

A. -1

B. 1

C. 0

D. $\frac{1}{2}$

Answer: C

Watch Video Solution

73. $\int \frac{\sin x}{\cos^2 x} dx$ equals :

A. sec x + c

B. tan x + c

C. cosec x + c

D. $\sec^2 x + c$

Answer: A

Watch Video Solution

74. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$ is equal to :

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

Watch Video Solution

75. The number of arbitrary constants in the particular solution of a differential equation of fifth order is :

A. 0

B. 2

C. 3

D. 5

Answer: A

Watch Video Solution

76. The Integrating Factor of the differentiate equation $\frac{dy}{dx} - 2y = 3x$ is :

A. e^{2x}

B. e^{-2x}

C. e^{x}

D. 2x

Answer: B

Watch Video Solution

77. If $\vec{a} = \hat{i} + 2\lambda\hat{j} + \hat{k}$ and $\vec{b} = 2\hat{i} + \hat{j} - 3\hat{k}$ are perpendicular to each other, the value of λ is :

A. 0

B. 1

C. 2

D. $\frac{1}{2}$

Answer: D

Watch Video Solution

78. If θ is the angle between any two vectors $\vec{a}$ and $\vec{b}$, then $\left|\vec{a}.\vec{b}\right| = \left|\vec{a} \times \vec{b}\right|$ when θ is equal to :

A. 0

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: B

Watch Video Solution

79. The distance of the plane $\vec{r}.\left(2\hat{i} + 3\hat{j} - 6\hat{k}\right) = 7$ from origin is :

A. -1

B. 0

C. $\frac{1}{7}$

D. 1

Answer: D

Watch Video Solution

80. In a single throw of two dice, the chances of throwing a sum of 5 is :

A. 0

B. $\frac{1}{36}$

C. $\frac{1}{9}$

D. $\frac{5}{36}$

Answer: C

Watch Video Solution

81. If f is a bijection, then it is.....

Watch Video Solution

82. If |A| = 3. where A is a 2×2 matrix, |Adj A| = ...

Watch Video Solution

83. $\frac{d}{dx}\left(x^2+2x+5\right)^2$ = ...

Watch Video Solution

84. The slope of tangent to the curve $y = 2 - x^2$ at x = 1 is

Watch Video Solution

85. The value of $\int_{-\pi}^{\pi} \sin^{2019} x \cos^{2020} x dx$ is equal to.....

Watch Video Solution

86. Degree of differential equation $\left(\frac{dy}{dx}\right)^3 + \frac{d^3y}{dx^3} = 5$ is .....

Watch Video Solution

87. The distance between the planes $3x + 2y - 6z - 18 = 0$ and $3x + 2y - 6z + 10 = 0$ is

Watch Video Solution

88. If A and B are mutually exclusive, then $P(A \cap B)$ is equal to _____.

Watch Video Solution

89. The value of the expressions $\left(\cos^{-1} x\right)^2$ is equal to $\sec^2 x$.

Watch Video Solution

90. $\left(A^3\right)^{-1} = \left(A^{-1}\right)^3$, where A is a square matrix and $|A| \neq 0$.

Watch Video Solution

91. Derivative of $\sin^{-1}(\cos x)$ w.r.t. x is 1

Watch Video Solution

92. *prove*: $\int \frac{\sin^2 x}{1+\cos x} dx = x + \sin x + c.$

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93. If $\vec{a} = \hat{i} + 4\hat{j} + 4\hat{k}$ and $\vec{b} = 4\hat{i} - \hat{j} + 2\hat{k}$, then $\vec{a} . \vec{b}$ is equal to 8.

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94. If a line makes angles α, β, γ respectively with positive directions of the coordinate axes, then the value of $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$.

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95. Quadrant represented by the region $x \geq 0, y \geq 0$ is first.

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96. If A and B are two events such that $P(A) > 0$ and $P(A) + P(B) > 1$, then $\mathrm{P}(B \mid A) \geq 1 - \dfrac{P(B')}{P(A)}$.

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