NOTE: All questions are one marks

CHAPTER : 1 RELATIONS AND FUNCTIONS

Q. 1. $If\ (x) = \frac{x-1}{x+1},\ x \neq -1, then\ find\ f^{-1}(x).$

Q. 2.
$If : R \to be\ a\ bijection\ given\ by$
$f\ (x) = x^3 + 3,\ find\ f^{-1}(x).$

Q. 3. If '*' is defined on the set R of all real numbers by $a * b = \sqrt{a^2 + b^2}$, find the identity element in R w.r.t. *.

Q. 4. If '*' is defined on the set R of all real numbers by $a * b = \frac{3ab}{7}$, find the identity element in R for the binary operation *.

Q. 5. $If\ f : R \to is\ defined\ by\ f\ (x) = x^2 - 3x + 2,\ find\ f\ (f(x)).$

Q. 6. Find the identity element in the set Q+ ' defined by∗of positive rational numbers for the operation '
$a * b = \frac{ab}{2}\ \forall a, b \in Q^+$

Q. 7. Show that the function
$f : N \to N\ given\ by\ f(1) = f(2) = 1\ and\ f\ (x) = x - 1,\ for\ every\ x > 2$ is onto but not one-one.

Q. 8. Show the relation R on the set $A = \{1, 2, 3\}\ given by\ R = \{(1, 2), (2, 1)\}$ is symmetric but neither reflexive nor transitive.

Q. 9.
$If\ f : R \to R\ is\ given\ by\ f\ (x) = (3 - x^3)^{\frac{1}{3}}, then\ find\ fof\ (x).$

Q. 10 .
$If\ f\ (x) = x3,\ g(x) = \cos^3 x, then\ find$

i. fog
ii. gof

Q. 11.

$Let\ f\ (x) = \sin\ x, \quad f : \left[0, \frac{\pi}{2}\right] \to R\ and\ g(x) = \cos x,$

$g : \left[0, \frac{\pi}{2}\right] \to R, then\ show\ that\ f + g\ is\ not\ one - one.$

CHAPTER : 2 INVERSE TRIGONOMETRIC FUNCTIONS

Q. 1.

$Prove\ that\ \cos^{-1} x = 2\sin^{-1}\sqrt{\frac{1-x}{2}}.$

Q. 2.

$Prove\ that\ \tan^{-1} x = \frac{1}{2}\cos^{-1}\left(\frac{1-x}{1+x}\right),\ x \in (0, 1).$

Q. 3.

$Prove\ that\ \tan^{-1}\frac{2}{11} + \tan^{-1}\frac{7}{24} = \tan^{-1}\frac{1}{2},$

Q. 4.

$Prove\ that\ \cos^{-1}\frac{4}{5} + \cos^{-1}\frac{12}{13} = \cos^{-1}\frac{33}{65},$

Q. 5. $Evaluate\ \sin\ (\cot^{-1} x)$

Q. 6. Find the Value of

i. $\sin^{-1}\left(\sin\frac{3\pi}{5}\right)$

ii. $\tan^{-1}\left(\sin\frac{3\pi}{4}\right)$

Q. 7. Write the following in simplest form :

i. $\tan^{-1}\frac{\sqrt{1+x^2}-1}{x},\ x \neq 0$

ii. $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right)$

Q. 8.

$Simplify : \tan^{-1}\left[\frac{a\cos x = b\sin x}{b\cos x + a\sin x}\right], if\ \frac{a}{b}\tan\ x > -1.$

Q. 9. Find the principal value of :

i. $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

ii. $\cos^{-1}\left(-\frac{1}{2}\right)$

CHAPTER : 3 MATRICES

Q. 1. If a matrix has 8 elements. What are the possible orders it can have? What if it has 5 elements?

Q. 2.

$$If \begin{bmatrix} x+3 & 2x \\ 6 & y \end{bmatrix} = \begin{bmatrix} 7 & 8 \\ 6 & 3 \end{bmatrix}, then\ find\ the\ Values\ of\ x\ and\ y.$$

Q. 3.

$$Construct\ a\ 2\times 2\ matrix\ A=(a_{ij}), where\ elements\ are\ given\ by\ a_{ij}=\frac{|i-2j|}{2}$$

Q. 4.

$$Let\ A=\begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B=\begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, find\ BA.$$

Q. 5. Show that the matrix $A=\begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$ is skew symmetric.

Q. 6.

$$If\ A=\begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}, Show\ that\ A-A^T\ is\ skew\ symmetric\ matrix.$$

Q. 7. Give examples of matrices A and B such that $AB=0\ but\ BA\neq 0.$

Q. 8. Let A be a square matrix. Then check whether$A + A^T$ is a symmetric matrix.

Q. 9. Show that the elements on the main diagonal of a skew symmetric matrix are all zero.

Q. 10. Let A and B be symmetric matrices of same order. Then show that AB - BA is a skew symmetric matrix.

Q. 11. Let A and B be symmetric matrices of same order. Then show that AB + BA is a symmetric matrix.

Q. 12. Give examples of matrices A and B such that $AB\neq BA.$

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Q. 13. Show that the matrix BT A B symmetric according as A is symmetric.

Q. 14.

$$If\ A=\begin{bmatrix}a & 0\\ 1 & 1\end{bmatrix}\ and\ B=\begin{bmatrix}1 & 0\\ 5 & 1\end{bmatrix},\ find\ the\ value\ of\ \alpha\ for\ which\ A^2=B.$$

Q. 15.

$$If\begin{bmatrix}x & 3x-y\\ 2x+z & 3y-w\end{bmatrix}=\begin{bmatrix}3 & 2\\ 4 & 7\end{bmatrix},\ find\ x,y,z,w.$$

Q. 16.

$$If\ A=\begin{bmatrix}3 & -2\\ 4 & -2\end{bmatrix},then\ find\ the\ value\ of\ K\ for\ which\ A^2=KA-2I$$

CHAPTER : 4 DETERMINANTS

Q. 1.

$$Evaluate:\begin{bmatrix}x & -7\\ x & 5x+1\end{bmatrix}.$$

Q. 2.

$$If\ A=\begin{bmatrix}a & c\\ b & d\end{bmatrix},\ then\ find\ adjA$$

Q. 3. Without expanding prove that $\begin{vmatrix}1 & a & a^2 & -bc\\ 1 & b & b^2 & -ac\\ 1 & c & c^2 & -ab\end{vmatrix}=0.$

Q. 4. For what Value of x the matrix $A=\begin{bmatrix}1 & -2 & 3\\ 1 & 2 & 1\\ x & x & -3\end{bmatrix}\ is\ sin\ gular.$

Q. 5. If A is a matrix of order 3 and |A| = 8 , then find the value of |adj A|

Q. 6. Without expanding evaluate the determinant $\begin{vmatrix}41 & 1 & 5\\ 79 & 7 & 9\\ 29 & 5 & 3\end{vmatrix}.$

Q. 7. Find the adjoint of the matrix $\begin{vmatrix}-3 & 5\\ 2 & 4\end{vmatrix}.$

Q. 8. $If\ A=\begin{bmatrix}1 & 2\\ 4 & 2\end{bmatrix}, then\ show\ that\ |2A| = 4|A|$

Q. 9. $Let \begin{vmatrix}3 & y\\ x & 1\end{vmatrix} = \begin{vmatrix}3 & 2\\ 4 & 1\end{vmatrix}$. Find the possible values of x and y, if x, $y \in N$.

Q. 10.

$If \begin{vmatrix}3 & m\\ 4 & 5\end{vmatrix} = 3.\ Write\ the\ value\ of\ m.$

Q. 11.

$If \begin{vmatrix}2 & 4\\ 5 & 1\end{vmatrix} = \begin{bmatrix}2x & 4\\ 6 & x\end{bmatrix}$, then find the value of x.

CHAPTER : 5 CONTINUITY AND DIFFERENTIABILITY

Q. 1.

$If\ 3\sin(xy) + 4\cos(xy) = 5, then\ find\ \frac{dy}{dx}.$

Q. 2.

$Find\ 'a'\ if\ '(a) = 0, Where\ f(x) = x^3 - 3x^2 + 3x - 1.$

Q. 3.

$If\ 2x + 3y = \sin x, find\ \frac{dy}{dx}.$

Q. 4.

$Find\ \frac{dy}{dx}, if\ xy = c^2.$

Q. 5.

$If\ y = \sin -1\left(\frac{1-x^2}{1+x^2}\right), then\ find\ \frac{dy}{dx}.$

Q. 6. Find the derivative of sin x with respect to log x .

Q. 7.

$If\ x = at^2, y = 2at, then\ find\ \frac{d^2y}{dx^2}.$

Q. 8. Find the derivative of x a with respect to x , where a is a positive constant.

$$f(x) = \begin{cases} \frac{(x3-8)}{(x-2)}, & x \neq 2 \\ & x = 2 \end{cases}$$

Q. 9. If the function f defined by is continuous at x = 2 , then find the value of k .

Q. 10. Find the value of k , it is given that the function

$$f(x) = \begin{cases} kx2, & if \quad x \leq 2 \\ 3, & if \quad x > 2 \end{cases} \text{ is continuous at } x = 2.$$

CHAPTER : 6 APPLICATION OF DERIVATIVES

Q. 1. Find maximum and minimum values of the function $f(x) = 3x^2 + 6x + 8, \; x \in R.$

Q. 2. Prove that the function $f(x) = x^2 - x + 1.$ is neither increasing nor decreasing on (-11).

Q. 3. Find the slope of the tangent to the curve $x^2 + 3y + y^2 = 5 \; at \; (1,1).$

Q. 4. The distance moved by a particle traveling in a straight line in t seconds is given by $s = 45t + 11t^2 - |t^3$. Find the time taken by the particle to come to the rest.

Q. 5. The radius of a circle is increasing at the rate of 0.7 cm/sec. What is the rate of increase of its circumference?

Q. 6. The radius of a circle is increasing at the rate of 0.1 cm/sec. Determine the rate of change of area when radius of the circle is 5cm.

Q. 7. Find the rate of change of volume of a sphere w.r.t. its surface area, when the radius is 2cm.

Q. 8. Show that the function f (x) = 2x + 3 is strictly increasing on R .

Q. 9. Find the equation of the tangent to the curve $y = -5x^2 + 6x + 7 \; at \; the \; point \left(\frac{1}{2}, \frac{35}{4}\right).$

Q. 10. Find the interval on which $f(x) = 10 - 6x - 2x^2$ is strictly increasing or decreasing.

Q. 11. For the function $y = x^3 + 21$, find the value of x when y increases 75 times as fast as x .

Q. 12. It is given that at x -1, the function $f(x) = x^4 - 62x^2 + ax + 9$ attains its maximum value on the interval $[0, 2]$. Write the value of a .

CHAPTER : 7 INTEGRALS

Q. 1. Evaluate:

i. $\int \frac{1}{\sin^2 x \cos^2 x} dx$

ii. $\int \frac{x}{4+x^4} dx$

iii. $\int \frac{3x}{1+2x^4} dx$

iv. $\int \left(e^{a\log x} + e^{x\log a} + e^{a\log a}\right) dx$

v. $\int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$

vi. $\int \frac{1+\cos x}{x+\log \sin x} dx$

Q. 2. Evaluate:

i. $\int_{-1}^{1} |1-x| dx$

ii. $\int_{0}^{1.5} |x^2| dx$

iii. $\int_{0}^{\frac{\pi}{2}} \frac{1}{1+\tan^2 x} dx$

iv. $\int_{0}^{3} [x] dx$

v. $\int_{0}^{4} \frac{1}{x+\sqrt{x}} dx$

vi. $\int_{0}^{\infty} \frac{\sin(\tan^{-1} x)}{1+\tan^2 x} dx$

vii. $\int_{0}^{\pi} \frac{1}{1+\sin x} dx$

Q. 3.

$$Evaluate \int_{-1}^{1} f(x)\,dx \; Where \; f(x) = \begin{cases} 1-2x, & x \le 0 \\ 1+2x, & x \ge 0. \end{cases}$$

Q. 4.

$$Evaluate \int_{1}^{4} f(x)\,dx \; Where \; f(x) = \begin{cases} 4x+3, & 1 \le x \le 2 \\ 3x+5, & 2 \le x \le 4. \end{cases}$$

CHAPTER : 8 DIFFERENTIAL EQUATIONS

Q. 1. Find the order of the differential equation $y = \frac{dy}{dx} + \sqrt{1 + \left(\frac{dy}{dx}\right)^3}$.

Q. 2. Find the general solution of the differential equation $\frac{dy}{dx} = \frac{y}{x}$.

Q. 3. Find the degree and order of the differential equations:

i. $(y''')^2 + (y'')^3 + (y')^4 \cdot y^5 = 0$

ii. $t^2 \frac{d^2s}{dt^2} - st\left(\frac{ds}{dt}\right)^2 = 5$

iii. $\left(\frac{d^3y}{dx^3}\right)^{2/3} = x$

iv. $y'' + 2y' + \sin y = 0$

v. $\left(\frac{d^2y}{dx^2}\right) + \cos\left(\frac{dy}{dx}\right) = 0$

vi. $\frac{d^2y}{dx^2} + 5x\left(\frac{dy}{dx}\right)^2 - 6y = \log x$

Q. 4. Find the solution of the differential equation $\frac{dy}{dx} + \frac{2y}{x} = 0 \text{ with } y(1) = 1.$

Q. 5. Find the integrating factor of the differential equation :

i. $\frac{dy}{dx} + \frac{x + y\cos x}{1 + \sin x}$

ii. $(1 - y^2)\frac{dy}{dx} + yx = ay \ (-1 < y < 1)$

iii. $x\frac{dy}{dx} - y = 2x^2$

iv. $\frac{dy}{dx} + 2y\tan x = \sin x$

CHAPTER : 9 VECTORS

Q. 1.

$Find \ |\vec{a} - \vec{b}|, \ if \ two \ Vectors \ \vec{a} \ and \ \vec{b} \ are \ such \ that \ |\vec{a}| = 2, |\vec{b}| = 3 \ and \ \vec{a} \cdot \vec{b} = 4.$

Q. 2. Find a unit vector perpendicular to both $\hat{i} + \hat{j} \ and \ \hat{j} + \hat{k}$

Q. 3. For two non zero vectors $\vec{a} \ and \ \vec{b} \ write \ when \ |\vec{a} + \vec{b}| = |\vec{a}| + |\vec{b}| \ holds?$

Q. 4.

Let $\vec{a}$ and $\vec{b}$ be two Vectors such that $|\vec{a}| = 3$ and $|\vec{b}| = \frac{\sqrt{2}}{3}$ and $\vec{a} \times \vec{b}$ is a unit Vector. Then what is the angle between $\vec{a}$ and $\vec{b}$

Q. 5. Write the value of $\hat{i}.(\hat{j} \times \hat{k}) + \hat{j}.(\hat{k} \times \hat{i}) + \hat{k}.(\hat{i} \times \hat{j})$

Q. 6. Find a unit vector in the direction of $\xrightarrow{a} = \hat{i} - 2\hat{j}$ that has magnitude 7 units.

Q. 7. Find the direction cosines of the vector $\hat{i} + 2\hat{j} + 2\hat{k}$.

Q. 8. Compute the area of a parallelogram diagonal vectors are $2\hat{i} - 3\hat{j} + 6\hat{k}$ and $2\hat{i} - 2\hat{j} - \hat{k}$.

Q. 9.

If θ is the angle between two vectors $\vec{a}$ and $\vec{b}$ such that $|\vec{a}.\vec{b}| = |\vec{a} \times \vec{b}|$, then find θ

Q. 10.

$\vec{a} = 4\hat{i} + 3\hat{j} + 2\hat{k}$ and $\vec{b} = 3\hat{i} + 2\hat{k}$, find $|\vec{b} \times \vec{2}a|$.

Q. 11. Find the angle between two vectors having same length $\sqrt{2}$ and their scalar product is -1.

Q. 12.

Find $(\vec{a} + 3\vec{b}).(2\vec{a} - \vec{b})$, if $\vec{a} = \hat{i} + \hat{j} + 2\hat{k}$ and $\vec{b} = 3\hat{i} + 2\hat{j} - \hat{k}$

Q. 13.

For ant two vectors $\vec{a}$ and $\vec{b}$, prove that $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}| \Leftrightarrow \vec{a} \perp \vec{b}$

Q. 14.

Find $|\vec{x}|$, if for a unit vector $\vec{a}$, $|\vec{x} - \vec{a}| = |\vec{x} + \vec{a}| = 15$.

Q. 15.

Find the value of λ so that Vectors $\vec{a} = 2\hat{i}\ \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} - 2\hat{j} + 3\hat{k}$ are perpendicular to each other.

Q. 16.

If $|\vec{a} \times \vec{b}| = 4$, $|\vec{a} \cdot \vec{b}| = 2$, then find $|\vec{a}|^2 |\vec{b}|^2$.

Q. 17.

If $\vec{a}.\hat{i} = \vec{a}.(\hat{i} + \hat{j}) = \vec{a}.(\hat{i} + \hat{j} + \hat{k}) = 1$, then find $\vec{a}$.

Q. 18. Find the projection of the vector $7\hat{i}+\hat{j}+4\hat{k}$ on $2\hat{i}+6\hat{j}+3\hat{k}$.

Q. 19.

$Find|\vec{a}|and|\vec{b}|.\ If\ (\vec{a}+\vec{b}).(\vec{a}-\vec{b})=8\ and\ |\vec{a}|=8|\vec{b}|$

CHAPTER : 10 THREE DIMENTIONAL GEOMETRY

Q. 1. Find the direction ratios of the line 6x – 1 = 2y + 3 = 5 – z.

Q. 2. Find the direction cosines of a line making angles 60^0,90^0,$30^0$with coordinate axes.

Q. 3. Write the direction ratios of the line normal to the plane x+ 2y – 3z + 4 = 0.

Q. 4. Find the direction cosines of y-axis.

Q. 5. Find the equation of a plane making equal intercepts on axes and passing through the point (2,8,3) .

Q. 6. Find the length of the perpendicular from the point (2,3,7) to the plane 3x – y – z = 7.

Q. 7. Write the Cartesian equations of the line passing through (-1,2,3) and equally inclined to the positive direction of x-axis.

Q. 8. Find the angle between the planes 2x -3y + 4z = 1 and –x + y = 4.

Q. 9.

$If\ the lines\ \frac{x-1}{-3}=\frac{y-2}{2k}=\frac{z-3}{2}\ and\ \frac{x-1}{3k}=\frac{y-1}{1}=\frac{z-6}{-5}$ are perpendicular. Find the value of k .

Q. 10. Find the angle between the line

$\frac{x+1}{3}=\frac{y-1}{2}=\frac{z-2}{4}\ and\ the\ plane\ 2x+y-3z+4=0.$

Q. 11. Find the distance of the point $2\hat{i}+\hat{j}-\hat{k}\ from\ the\ plane\ \vec{r}.(\hat{i}-2\hat{j}+4\hat{k})=9.$

Q. 12. Find the angle between the following pair of lines:

$\frac{x+4}{3}=\frac{y-1}{5}=\frac{z+3}{4},\ \frac{x+1}{1}=\frac{y-4}{1}=\frac{z-5}{2}.$

Q. 13. Direction ratios of a line are proportional to (1, -3,2) , then find its direction cosines.

Q. 14. Write the equation of the plane whose intercepts on the coordinate axes are -4,2,3 .

Q. 15. Find the intercepts cut of by the plane 2x + y - z = 5.

CHAPTER : 11 PROBABILITY

Q. 1. An unbiased die is rolled. If the random variable X is defined as

$$X(w) = \begin{cases} 1, \text{if the outcome is an even number} \\ 0, \text{if the outcome is an odd number} \end{cases}$$

Find probability distribution of X.

Q. 2. A couple has two children. Find the probability that both children are male, if it is known that one of the children is male.

Q. 3. Events A and B are such that $P(A) = \frac{1}{2}, P(B) = \frac{7}{12}$ and $P(\text{not } A \text{ or not } B) = \frac{1}{4}$.
State whether
A and B are independent.

Q. 4. In a probability distribution mean is 10 and standard deviation is $2\sqrt{2}$. Find the probability of happening of an event.

Q. 5. "Two cards are drawn successively with replacement from a well shuffled pack of 52 cards". Find the probability distribution of number of queens.In the above statement

i. What is the random variable?
ii. What values a random variable can take?

Q. 6. A random variable X has following probability distribution :

X	0	1	2	3
P(X)	0.3	k	0.1	2k

Find k.

Q. 7. A and B are two events such that $P(A) = 0.3, P(B) = 0.2$ and $P(A \cap B) = 0.05$. Can you conclude events A and B are independent? Give reason.

Q. 8. In a throw of die the number obtained is an odd number. Find the probability of getting a number less than 6.

Q. 9. In a probability distribution mean is 3 and standard deviation is $\sqrt{2}$. Find the probability of non-happening of an event.

Q. 10. For the binomial distribution mean is 4 and variance 6. Is the statement true? Give reason.

Q. 11. A coin is tossed once. Find the probability distribution of number of heads obtained.

Q. 12. A pair of dice is thrown. If the sum is seven. Find the probability that one of the dice shows three.

Q. 13. A die is thrown, if the outcome is an odd number. What is the probability that it is a prime?

Q. 14.

$If\ P(A) = 0.3, P(\overline{B}) = 0.7\ and\ P(A \cup B) = 0.5.\ Find\ P(B / A).$

Q. 15.

$P(\overline{A}) = 0.4, P(B) = 0.2\ and\ P(B / A) = 0.5.\ Find\ P(A \cap B).$

Q. 16. Probability of a success in an experiment of 4 trials is $\frac{1}{3}$. Find the probability of no success.

Q. 17. The mean and variance of a binomial distribution are 4 and $\frac{4}{3}$ respectively. Find $P(x \geq 1).$

Q. 18. A die is tossed thrice. Find the probability of getting an odd number at least once.

ANSWERS

CHAPTER : 1 RELATIONS AND FUNCTIONS

1. $f^{-1}(x) = \frac{1-x}{1+x}$
2. $f^{-1}(x) = (x-3)^{\frac{1}{3}}$
3. 0
4. $\frac{7}{3}$
5. $x^4 - 6x^3 + 10x^2 - 3x$
6. 2
7. x
8. (i) $\cos^3 3x$
   (ii) $\cos 3\,3x^3$

CHAPTER : 2 INVERSE TRIGONOMETRIC FUNCTIONS

5. $\sqrt{1-x^2}$

6. i. $\frac{2\pi}{5}$

   ii. $-\frac{\pi}{4}$

7. i. $\frac{1}{2}\tan^{-1}x$

ii. $\frac{\pi}{4}-x$

8. $\tan^{-1}\frac{a}{b}-x$

9. i. $\frac{\pi}{4}$

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

CHAPTER : 3 MATRICES

1. $\{1\times 8, 8\times 1, 2\times 4, 4\times 2; 5\times 1, 1\times 5\}$

2. 4, 3

3. $\begin{bmatrix} -\frac{1}{2} & -\frac{3}{2} \\ 0 & -1 \end{bmatrix}$

4. $\begin{bmatrix} 11 & 10 \\ 11 & 2 \end{bmatrix}$

7. $A=\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \quad B=\begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$

14. $\alpha = \pm 1$

15. x = 3, y = 9, z = -2, w = 20

16. k = 1

CHAPTER : 4 DETERMINANTS

1. $5x^2+8x$

2. $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

4. -1

5. 64

6. 0

7. $\begin{bmatrix} 4 & -2 \\ -5 & -3 \end{bmatrix}$

8. x = 4, y = 2; x = 2, y = 4; x = 8, y = 1; x= 1, y = 8

10. m = 3

11. $x = \pm\sqrt{3}$

CHAPTER : 5 CONTINUITY AND DIFFERENTIABILITY

1. $-\frac{y}{x}$

2. a = 0

3. $\frac{1}{3}(\cos x - 2)$

4. $-\frac{y}{x} or -\frac{c^2}{x^2}$

5. $\frac{-2}{1+x^2}$

6. $x\cos x$

7. $-\frac{1}{2at^3}$

8. $a^x \log a$

9. k = 12

10 $k = \frac{3}{4}$

CHAPTER : 6 APPLICATION OF DERIVATIVES

1. Max value 5, Min value does not exist

3. $-\frac{2}{5}$

4. 9 sec

5. 1.4 cm/sec.

6. $\pi\ cm^2\ /\ \sec$

7. 1 cm

9. $y = x + \frac{33}{4}$

10. $x > -\frac{3}{2} and\ x < -\frac{3}{2}$

11. $x = \pm 5$

12. a = 120

CHAPTER : 7 INTEGRALS

1. i. $\tan x - \cot x + c$

   ii. $\frac{1}{4}\tan^{-1}\frac{x^2}{2} + c$

   iii. $\frac{3}{2\sqrt{2}}\tan^{-1}\left(\sqrt{2x}^2\right) + c$

   iv. $\frac{a^x}{\log a} + \frac{x^{a+1}}{a+1} + a^a x + c$

   v. $\log\ (e^x - e^{-x}) + c$

   vi. $\log\ (\log\ \sin\ x + x) + c$

2. i. 2

   ii. $2 - \sqrt{2}$

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

   iv. 3

   v. 2 log 5

   vi. 1

   vii. 1

3. 4

4. 37

CHAPTER : 8 DIFFERENTIAL EQUATIONS

1. 1

2. y = xc

3. i. 2, 3
   ii. 1, 2

   1. 2, 3
   2. 1, 2
   3. not defined, 2

4. $\sqrt{y} = x$

5. i. 1 + sinx

   ii. $\frac{1}{x}$

   iii. $\frac{1}{\sqrt{1-y^2}}$

   iv. $\sec^2 x$

CHAPTER : 9 VECTORS

1. $\sqrt{5}$

2. $\frac{1}{\sqrt{3}}(\hat{i}+\hat{j}+\hat{k})$

3. $When\ \vec{a}\ and\ \vec{b}\ are\ collinear$

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

5. 3

6. $\frac{7}{\sqrt{5}}(\hat{i}-2\hat{j})$

7. $\frac{1}{3}, \frac{2}{3}, \frac{2}{3}$

8. $\frac{5\sqrt{17}}{2} \quad \frac{1}{\sqrt{3}}(\hat{i}+\hat{j}+\hat{k})$

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

10. $\sqrt{404}$

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

12. - 15

14. $|\vec{x}| = 4$

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

16. 20

17. $\hat{i}$

18. $\frac{8}{7}$

19. $|\vec{b}| = \sqrt{\frac{8}{63}}, |\vec{a}| = \frac{8\sqrt{8}}{\sqrt{63}}$

CHAPTER : 10 THREE DIMENTIONAL GEOMETRY

1. $\langle 1, 3, -6 \rangle$

2. $\left\langle \frac{1}{2}, 0, \frac{\sqrt{3}}{2} \right\rangle$

3. $\langle 1, 2, -3 \rangle$

4. $\langle 0, 1, 0 \rangle$

5. $x + y + z - 13 = 0$

6. $\sqrt{11}$

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

8. $\cos^{-1}\left(\frac{-5}{\sqrt{58}}\right)$

9. $-\frac{10}{7}$

10. $\sin^{-1}\left(\frac{4}{\sqrt{406}}\right)$

11. $\frac{13}{\sqrt{21}}$

12. $\cos^{-1}\left(\frac{8}{5\sqrt{3}}\right)$

13. $\left\langle \frac{1}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{2}{\sqrt{14}} \right\rangle$

14. $3x - 6y - 4z + 12 = 0$

15. $\frac{5}{2}, 5, -5$

CHAPTER : 11 PROBABILITY

1.

X	0	1
P (X)	$1/2$	$1/2$

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

3. Not independent

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

5. i. No. of queens
   ii. 0, 1, 2

6. k = 0.2

7. $No,\ P(A \cap B) \neq P(A)\ P(B)$

8. 1

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

10. False as Mean > Variance

11.

X	0	1
P (X)	$\frac{1}{2}$	$\frac{1}{2}$

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

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

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

15. 0.3

16. $\left(\frac{2}{3}\right)^4$

17. $\frac{728}{729}$

18. $\frac{7}{8}$