A.P. OPEN SCHOOL SOCIETY - HYDERABAD

INTERMEDIATE (APOSS)

Subject : MATHEMATICS

TUTOR MARKED ASSIGNMENT - I

SET - 1

1. Find the Modulus of z and $-z$ if $z = 5+2i$.

2. If $z_1 = (5+i)$ and $z_2 = (6+i)$ find $z_1 + z_2$.

3. Find the Modulus of the complex number $(1+i)\ (4-3i)$.

4. If $z_1 = 3-2i,\ z_2 = 1-5i$ show that $|z_1 z_2| = |z_2||z_1|$.

5. If one root of the equation $ax^2 + bx + c = 0,\ a \neq 0$ be the square of the other, prove that $b^3 + ac^2 + a^2 c = 3abc \cdot$

SET - 2

1. Evaluate $(1+2i)(1-2i)$

2. Find the multiplicative inverse of $2-4i$.

3. Divide $3+i$ by $4-2i$.

4. If $z_1 = 2+3i,\ z_2 = 1+i$ verify $|z_1 + z_2| \leq |z_1| + |z_2|$.

5. If l, w, w^2 are cube roots of unity, prove that

   a) $(1+w^2+w^7) = 0$ b) $(1-w+w^2)(1+w-w^2) = 4.$

SET - 3

1. Find the nature of the roots of the equation $9x^2 - 6\sqrt{2}x + 2 = 0$.

2. Solve the equation by Quadratic formula $2x^2 - 3x + 3 = 0$.

3. If $z_1 = (1+i),\ z_2 = (1-i),\ z_3 = 2+3i$ find $z_1 - (z_2 - z_3)$.

4. If $z_1 = 2+i,\ z_2 = -2+i,\ z_3 = 2-i$ verify $(z_1 z_2) z_3 = z_1 (z_2 z_3)$.

5. If $x = a+b,\ y = aw + bw^2$ and $z = aw^2 + bw,$ then prove that

   a) $x^2 + y^2 + z^2 = 6ab$ b) $xyz = a^3 + b^3$

SET - 4

1. If $1, w, w^2$ are the qube roots of unity prove that $1 + w^2 + w^7 = 0$.

2. If α, β are the roots of the equation $3x^2 - 5x + 9 = 0$ find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

3. $z_1 = 3+4i,\ z_2 = 1-i$ then show that $z_1 z_2 = z_2 z_1$.

4. If α, β are the roots of the equation $5x^2 - 6x + 3 = 0.$ Find the equation of the roots are α^2 and β^2.

5. For $A = \begin{bmatrix} 1 & -2 \\ 3 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ -1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 0 \\ 0 & 3 \end{bmatrix}$ find

   a) (AB)C b) A(BC) IS(AB)C = A(BC) ?

SET - 5

1. Determine the values of x and y if $\begin{bmatrix} x & 2 \\ 3 & -y \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$.

2. If $A = \begin{bmatrix} 0 & -1 & 2 \\ 3 & 1 & 4 \end{bmatrix}$ find $-3A$.

3. Solve the quadratic equation $6x^2 + 5x - 6 = 0$ by using factorization method.

4. If cube roots of 1 are $1, w, w^2$ show that $(1-w)(1-w^2)(1-w^4)(1-w^8) = 9$.

5. Show that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$

SET - 6

1. $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$ then find A + B.

2. Define the skew-symmetric matrics.

3. If α, β are the roots of the equation $9y^2 + 6y + c = 0$ then find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$.

4. If $A = \begin{bmatrix} 2 & 0 & -1 \\ 4 & 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 0 & 1 \\ 2 & -4 & 0 \end{bmatrix}$ find (A+B)' and A' + B'.

5. Show that $\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$

SET - 7

1. Evaluate $\begin{vmatrix} 6 & 4 \\ 8 & 2 \end{vmatrix}$.

2. Define singular matrix.

3. For what value of K with the equation $y^2 - 2(1+2k)y + 3 + 2k = c$ have equal roots.

4. If $\mathrm{A} = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $\mathrm{I} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $\mathrm{A}^2 - (a+d)\mathrm{A} = (bc - ad)\mathrm{I}$.

5. solve for x.

$$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0.$$

SET - 8

1. Find the co-factor of the element 6 in the determinant $\begin{vmatrix} 1 & 2 & 3 \\ -4 & 3 & 6 \\ 2 & -7 & 9 \end{vmatrix}$.

2. Find the adjoint of the matrix $\mathrm{A} = \begin{bmatrix} 4 & 5 \\ 2 & -3 \end{bmatrix}$.

3. Solve the equation $-3y^2 + \sqrt{5}y - 2 = 0$.

4. If $\mathrm{A} = \begin{bmatrix} -8 & 5 \\ 2 & 4 \end{bmatrix}$ show that $\mathrm{A}^2 + 4\mathrm{A} - 2\mathrm{I} = 0$.

5. Show that $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2$.

SET - 9

1. If $A=\begin{bmatrix}2 & 3 & 0\end{bmatrix}$ and $B=\begin{bmatrix}0\\-1\\2\end{bmatrix}$ find AB.

2. If $A=\begin{bmatrix}2 & 0 & -1\\4 & 3 & 2\end{bmatrix}$ then find A'.

3. $A=\begin{bmatrix}1 & 2\\-1 & 3\end{bmatrix}$, $B=\begin{bmatrix}0 & -2\\1 & 3\end{bmatrix}$ then show that A + B = B + A.

4. If cube root of 1 is 'w' show that $\begin{vmatrix}1 & w & w^2\\w & w^2 & 1\\w^2 & 1 & w\end{vmatrix}=0.$

5. Prove that $\begin{vmatrix}b+c & a & a\\b & c+a & b\\c & c & a+b\end{vmatrix}=4abc.$

SET - 10

1. For what values of x and y. $5x+6yi$ and $10+18i$ are equal.
2. Find the conjugate of the complex number $1-2i.$
3. $A=\begin{bmatrix}3 & -1\\5 & 2\end{bmatrix}$, $B=\begin{bmatrix}0 & -1\\3 & 2\end{bmatrix}$ then find 2A + 3B.
4. Show that $\begin{vmatrix}x+3 & x & x\\x & x+3 & x\\x & x & x+3\end{vmatrix}=27(x+1).$
5. Solve the following system of equation by Cramer's Rule.

$$\begin{aligned}2x+y-3z&=3\\x+2y+z&=5\\3x-55y+dz&=1\end{aligned}$$

SET - 11

1. If $1, w, w^2$ are cube roots of unity, prove that

   a) $\left(1+w^2+w^7\right)=0$ b) $\left(1-w+w^2\right)\left(1+w-w^2\right)=4.$

2. If $z_1=2+i,\ z_2=-2+i,\ z_3=2-i$ verify $\left(z_1z_2\right)z_3=z_1\left(z_2z_3\right).$

3. If $z_1=3-2i,\ z_2=1-5i$ show that $\left|z_1z_2\right|=\left|z_2\right|\left|z_1\right|.$

4. Divide $3+i$ by $4-2i$.

5. If α,β are the roots of the equation $3x^2-5x+9=0$ find the value of $\frac{1}{\alpha}+\frac{1}{\beta}.$

SET - 12

1. Show that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix}=\left(a+b+c\right)^3$

2. If $x=a+b,\ y=aw+bw^2$ and $z=aw^2+bw,$ then prove that

   a) $x^2+y^2+z^2=6ab$ b) $xyz=a^3+b^3$

3. If $z_1=2+3i,\ z_2=1+i$ verify $\left|z_1+z_2\right|\le\left|z_1\right|+\left|z_2\right|.$

4. Find the multiplicative inverse of $2-4i$.

5. Find the Modulus of z and $-z$ if $z=5+2i$.

SET - 13

1. If $z_1 = (5+i)$ and $z_2 = (6+i)$ find $z_1 + z_2$.

2. For $A = \begin{bmatrix} 1 & -2 \\ 3 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ -1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 0 \\ 0 & 3 \end{bmatrix}$ find

   a) (AB)C b) A(BC) IS(AB)C = A(BC) ?

3. $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$ then find A + B.

4. Evaluate $\begin{vmatrix} 6 & 4 \\ 8 & 2 \end{vmatrix}$.

5. Solve for x.

$$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0.$$

SET - 14

1. If one root of the equation $ax^2 + bx + c = 0,\ a \neq 0$ be the square of the other, prove that $b^3 + ac^2 + a^2c = 3abc$.

2. If $A = \begin{bmatrix} 0 & -1 & 2 \\ 3 & 1 & 4 \end{bmatrix}$ find $-3A$.

3. Show that $\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$

4. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $A^2 - (a+d)A = (bc-ad)I$.

5. Show that $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2$.

SET - 15

1. If $A=\begin{bmatrix}2 & 0 & -1\\ 4 & 3 & 2\end{bmatrix}$, $B=\begin{bmatrix}-1 & 0 & 1\\ 2 & -4 & 0\end{bmatrix}$ find (A+B)' and A' + B'.

2. If $A=\begin{bmatrix}-8 & 5\\ 2 & 4\end{bmatrix}$ show that $A^2+4A-2I=0.$

3. Find the Modulus of the complex number $(1+i)\ (4-3i)$.

4. Evaluate $(1+2i)(1-2i)$

1. Find the nature of the roots of the equation $9x^2-6\sqrt{2}x+2=0$.

SET - 16

1. If α, β are the roots of the equation $9y^2+6y+c=0$ then find the value of $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$.

2. If $z_1=(1+i),\ z_2=(1-i),\ z_3=2+3i$ find $z_1-(z_2-z_3)$.

3. Solve the equation by Quadratic formula $2x^2-3x+3=0$.

4. Find the co-factor of the element 6 in the determinant $\begin{vmatrix}1 & 2 & 3\\ -4 & 3 & 6\\ 2 & -7 & 9\end{vmatrix}$.

5. If $A=\begin{bmatrix}2 & 3 & 0\end{bmatrix}$ and $B=\begin{bmatrix}0\\ -1\\ 2\end{bmatrix}$ find AB.

SET - 17

1. Find the adjoint of the matrix $A=\begin{bmatrix}4 & 5\\ 2 & -3\end{bmatrix}$.

2. If cube root of 1 is 'w' show that $\begin{vmatrix}1 & w & w^2\\ w & w^2 & 1\\ w^2 & 1 & w\end{vmatrix}=0.$

3. $A=\begin{bmatrix}3 & -1\\ 5 & 2\end{bmatrix}$, $B=\begin{bmatrix}0 & -1\\ 3 & 2\end{bmatrix}$ then find 2A + 3B.

4. Solve the equation $-3y^2+\sqrt{5}y-2=0.$

5. For what value of K with the equation $y^2-2(1+2k)y+3+2k=c$ have equal roots.

SET - 18

1. If $1, w, w^2$ are the qube roots of unity prove that $1+w^2+w^7=0$.

2. Define singular matrix.

3. If $A=\begin{bmatrix}2 & 0 & -1\\ 4 & 3 & 2\end{bmatrix}$ then find A'.

4. Show that $\begin{vmatrix}x+3 & x & x\\ x & x+3 & x\\ x & x & x+3\end{vmatrix}=27(x+1).$

5. $z_1=3+4i$, $z_2=1-i$ then show that $z_1z_2=z_2z_1$.

SET - 19

1. If α, β are the roots of the equation $5x^2 - 6x + 3 = 0$. Find the equation of the roots are α^2 and β^2.

2. $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$ then show that A + B = B + A.

3. Solve the following system of equation by Cramer's Rule.

$$\begin{aligned} 2x + y - 3z &= 3 \\ x + 2y + z &= 5 \\ 3x - 55y + dz &= 1 \end{aligned}$$

4. Prove that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc.$

5. Determine the values of x and y if $\begin{bmatrix} x & 2 \\ 3 & -y \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$.

SET - 20

1. Solve the quadratic equation $6x^2 + 5x - 6 = 0$ by using factorization method.

2. If cube roots of 1 are $1, w, w^2$ show that $(1-w)(1-w^2)(1-w^4)(1-w^8) = 9.$

3. Define the skew-symmetric matrics.

4. For what values of x and y. $5x + 6yi$ and $10 + 18i$ are equal.

5. Find the conjugate of the complex number $1 - 2i.$

A.P. OPEN SCHOOL SOCIETY - HYDERABAD

INTERMEDIATE (APOSS)

Subject : MATHEMATICS

TUTOR MARKED ASSIGNMENT - II

SET - 1

1. If $\text{Cos}^{-1}x+\text{Cos}^{-1}y+\text{Cos}^{-1}z=\pi$ then prove that $x^2+y^2+z^2+2xyz=1$.
2. The 10th term of an A.P. is –15 and 31st term is –57, find the 15th term.
3. If $\text{A}=\{x: x\in z^+ \text{ and } \le 5\}$, $\text{B}=\{y: y \text{ is a prime no. less than } 10\}$ represent $\text{A}\cup\text{B}$ using Venn diagram.
4. Define a Singleton Set.
5. Find $f'(0)$ if $f(x)=16x+2$.

SET - 2

1. Prove that $\text{Cos}(\text{A}+\text{B})=\text{Cos A Cos B}-\text{Sin A Sin B}$.
2. If $a+b+c=0$ and $\frac{a}{b}+c$, $\frac{b}{c}+a$, $\frac{c}{a}+b$ are in A.P., then prove that $\frac{1}{b}+c$, $\frac{1}{c}+a$, $\frac{1}{a}+b$ are also in A.P.
3. If A = {2, 4, 6, 5, 8, 10}, B = {8, 10, 12, 14}, C = {14, 16, 18, 20} find $\text{A}\cup(\text{B}\cup\text{C})$ and $\text{A}\cap(\text{B}\cap\text{C})$.
4. What is meant by Disjoint Sets ?
5. Find $f'(0)$, if $f(x)=(5x-3)^7$.

SET - 3

1. Prove that $\text{Cos}\frac{\pi}{9}\ \text{Cos}\ 2\frac{\pi}{9}\ \text{Cos}\ \frac{\pi}{3}\ \text{Cos}\ 4\ \frac{\pi}{9}=\frac{1}{16}$.
2. The 35th term of an A.P. is 69. Find the sum of its 69 terms.

3. Find the domain of the following functions $y = \frac{1}{(x+2)(x-3)}$.

4. If $A = \{a, e, i, o, u\}$ and $B = \{e, i, o, u, a\}$ is $A \subseteq B$ or $B \subseteq A$ or both.

5. Find derivatives of second order of the functions x^3.

SET - 4

1. If $A = \frac{\pi}{6}$ then verify the following

$$\text{Cos } 2A = \text{Cos}^2 A - \text{Sin}^2 A = 2\text{Cos}^2 A - 1 = 1 - 2\text{Sin}^2 A = \frac{1 - \text{Tan}^2 A}{1 + \text{Tan}^2 A}.$$

2. Three numbers are in A.P. The difference between the first and the last is '8' and the product of these two is 20. Find the numbers.

3. If $f(x) = x^2$, $-3 \le x \le 3$ find its range.

4. Write the power set of $A = \{X : X \in R \text{ and } x^2 + 7 = 0\}$.

5. If $f(x) = e^x + 2 \text{ Cos } x$ then find $f'(x)$.

SET - 5

1. Prove that $\frac{\text{Cos A}}{1 - \text{Sin A}} = \text{Tan}\left(\frac{\pi}{4} + \frac{A}{2}\right)$.

2. The first term of an A.P. is 10, the last term is 50. If the sum of all the terms is 480, find the common difference and the number of terms.

3. Prove that $f : R \to R$ defined by $f(x) = 4x^3 - 5$ is a bijection.

4. If U = {1,2,3,4,5,6,7,8,9,10} and A = {2,3,4,5,7} then find A^C.

5. Evaluate $\frac{dy}{dx}$, if $y = \sin^{-1}\sqrt{x}$.

SET - 6

1. Prove the following :

   a) $\frac{\text{Sin } 2A}{1-\text{Cos } 2A} = \text{Cos A}$

   b) Tan A + Cot A = 2 Cosec 2A

2. The '*n*', A.M's between 20 and 80 are such that the ratio of the first mean and the last mean is 1 : 3. Find the value of '*n*'.

3. If $f(x) = \sqrt{x} + 1$ and $g(x) = x^2 + 2$ calculate $f \circ g$ and $g \circ f$.

4. If A = {*a, b, c*} and B = {*d, e*} find $A \times B$ and $B \times A$.

5. Fidn $\frac{dy}{dx}$, if $y = \log \sqrt{x}$.

SET - 7

1. Prove that $\text{Cos } \alpha \text{ Cos } \left(\frac{n}{3} - \alpha\right) \text{Cos}\left(\frac{n}{3} + \alpha\right) = \frac{1}{4}\text{Cos } 3\alpha.$

2. If the A.M's between p^{th} and q^{th} terms of an A.P. be equal to the A.M. between r^{th} and s^{th} terms of the A.P., then show that p+q = r+s.

3. Represent the following using Venn Diagram $(A \cap B)'$ provided A and B are Disjoint Sets.

4. If $f = \{(1,-2)(3,7)(4,-6)(8,1)\}$ then find Domain and Range.

5. If $f(r) = \frac{4}{3}\, n\, r^3$ then find $f'(r)$.

SET - 8

1. Find the values of $\text{Cos}\frac{\pi}{12}$ and $\text{Cos}\frac{\pi}{24}$.

2. The m^{th} term of an A.P. is '*n*' and the n^{th} term is '*m*'. Show that its $(m+n)^{th}$ term is zero.

3. If $f(x) = x^2 + 3,\ g(x) = 2x^2 + 1,$ find

   a) $f \circ g(3)$

   b) $g \circ f(3)$

4. If $f(x) = x^3$ and $g(x) = \frac{1}{x}$, $f : \mathrm{R} \to \mathrm{R}$ and $g : \mathrm{R} - \{0\} \to \mathrm{R} - \{0\}$ find the $f \circ g$.

5. If $y = 12$ then $\frac{dy}{dx}$.

SET - 9

1. Prove the following :

$$\mathrm{Tan}\ \alpha + 2\ \mathrm{Tan}\ 2\alpha + 4\ \mathrm{Tan}\ 4\alpha + 8\ \mathrm{Cot}\ 8\alpha = \mathrm{Cot}\ 2.$$

2. If $(b-c)^2,\ (c-a)^2,\ (a-b)^2$ are in A.P., then prove that $\frac{1}{b-c},\ \frac{1}{c-a},\ \frac{1}{a-b}$ are also in A.P.

3. If $\mathrm{Sin}\ \theta = \frac{21}{29}$ P.T. $\mathrm{Sec}\ \theta + \mathrm{Tan}\ \theta = 2\frac{1}{2}$, given that θ lies in the first quadrant.

4. Convert 90^0 into radiants.

5. Find $\frac{d}{dx}(x^n)$.

SET - 10

1. Find the general solution of the following $2\ \mathrm{Sin}^2\theta + \sqrt{3}\ \mathrm{Cos}\ \theta + 1 = 0$.

2. If the sum of the first 'n' terms of a sequence be $an^2 + bn$, prove that the sequence is an A.P. and find its common difference ?

3. If $\mathrm{Tan}\ \theta = \frac{1}{2}$, find the other five Trigonometric functions.

4. What will be the Sign of $\mathrm{Sin}\frac{7\pi}{8}$.

5. Find the derivative of the function $\frac{ax+b}{cx+d}$.

SET - 11

1. Show that $\text{Tan}^{-1}\left\{\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right\}=\frac{\pi}{4}+\frac{1}{2}\text{Cos}^{-1}(x^2)$.

2. The 4th term and 9th terms of a G.P. are 8 and 256 respectively. Find the G.P.

3. If $A=\frac{\pi}{3}$ and $B=\frac{\pi}{6}$ verify that Cos (A+B) = Cos A Cos B – Sin A Sin B.

4. If $\text{Cos}\,\theta=\frac{5}{13}$ find Sec θ.

5. Find $\frac{dy}{dx}$, if $y=\frac{1}{\sqrt{x}}$.

SET - 12

1. Prove that $\text{Sin}^{-1}\left(\frac{3}{5}\right)+\text{Sin}^{-1}\left(\frac{8}{17}\right)=\text{Sin}^{-1}\left(\frac{77}{85}\right)$.

2. If *a, b, c* and *d* are in G.P., then show that $(a+b)^2$, $(b+c)^2$ and $(c+d)^2$ are also in G.P.

3. If $\theta=\frac{\pi}{4}$ verify $\text{Cos}\,2\theta=1-2\,\text{Sin}^2\theta$.

4. Convert 15^0 in to radians.

5. If $f(x)=\frac{x^4}{4}+\frac{3}{7}x^7+2x-5$, find $f'(-2)$.

SET - 13

1. Prove that a $\text{Cos}\,B-\frac{C}{2}=(b+c)\,\text{Sin}\,\frac{A}{2}$ using sine formula.

2. These numbers are in G.P. Their sum is 43, and their product is 216. Find the numbers in proper order.

3. Draw the graph of $y=\text{Sin}\,2\theta$.

4. Convert $\frac{\pi}{6}$ radians into degrees.

5. Find $f'(x)$, If $f(x) = \frac{4x+3}{2x-1}$.

SET - 14

1. Using Sine furmulae show that $\frac{b+c}{b-c} = \text{Tan } \frac{\text{B}+\text{C}}{2} \cdot 2 \text{ Cot } \frac{\text{B}-\text{C}}{2}$.

2. Find the sum of the G.P. : 0.6, 0.06, 0.006, 0.0006, ... to n terms.

3. P.T. $\sqrt{\frac{1-\text{Sin } \theta}{1+\text{Sin } \theta}} = \text{Sec } \theta - \text{Tan } \theta$.

4. Show that $\text{Sin} \frac{5\pi}{9}$ is negative.

5. Find the $\frac{dy}{dx}$, if $y = at^2$, $x = 2at$.

SET - 15

1. In any Triangle ABC, show that $\frac{\text{Cos A}}{a} + \frac{\text{Cos B}}{b} + \frac{\text{Cos C}}{c} = \frac{a^2+b^2-c^2}{2ab}$.

2. Find the sum of the following sequence : 2, 22, 222, ... to n terms.

3. Evaluate $\text{Cos } \frac{19}{3\pi}$.

4. Find the value of $\text{Cos } \frac{2\pi}{3}$.

5. If $y = \text{Sec}(\text{Tan}^{-1}x)$ then find $\frac{dy}{dx}$.

SET - 16

1. In ΔABC, if $\angle A = 60^0$, prove that $\frac{b}{c+a}+\frac{c}{a+b}=1$.
2. Find the sum upto 'n' terms of the sequence : 0.7, 0.77, 0.777, ...
3. If $\theta=\frac{\pi}{4}$ verify that $\text{Sin } 3\theta = 3 \text{ Sin } \theta - 4 \text{ Sin}^3\theta$.
4. Define even function.
5. Find $\frac{dy}{dx}$, if $y = e^{7x+4}$.

SET - 17

1. The sides of the triangle are $a = 9$ cm, $b = 8$ cm, $c = 4$ cm, then show that 6 Cos C = 4+3 Cos B.
2. Express the recurring decimal $0.\overline{3}$ as an infinite G.P. and find its value in rational form.
3. What are the maximum and minimum values of $\text{Sin } \theta$ in $[0, 2\pi]$.
4. Define a bijection function.
5. Find $\frac{dy}{dx}$, if $y = \log(\log x)$.

SET - 18

1. In any ΔABC prove that $\frac{\text{Cos } 2A}{a^2}-\frac{\text{Cos } 2B}{b^2} > \frac{1}{a^2}-\frac{1}{b^2}$.
2. The arithmetic mean between two number is 34, and their geometric mean is 16. Find the numbers.
3. If $\text{Tan } \theta + \text{Sec } \theta = m$ find the value of $\text{Cos } \theta$.
4. Evaluate $Lim\ x \to 2 \quad \frac{x^3-8}{x-2}$.
5. Find the derivative of x^2 from the first principle.

SET - 19

1. If $a:b:c=7:8:9$ then prove that Cos A : Cos B : Cos C = 14 : 11 : 6.
2. The arithmetic mean between two quantities *b* and *c* is a and the two geometric means between them are g_1 and g_2. Prove that $g_1^3+g_2^3=2abc$.
3. If A = {7,8,9}, B = {9,10,11}, C = {11, 12} verify that $A\times(B\cup C)=(A\times B)\cup(A\times C)$.
4. Find the derivative of Cos 2*x* from first principle.
5. Find the tangent and normal to the curve $16x^2+9y^2=144$ at the point (x_1y_1) where $y_1>0$ and $x_1=2$.

SET - 20

1. In ΔABC prove that $\frac{b^2-c^2}{a^2}\text{Sin }2A+\frac{c^2-a^2}{b^2}\text{Sin }2B+\frac{a^2-b^2}{b^2}\text{Sin }2C=0$.
2. If *x, y, z* and pth, qth and rth terms of a G.P.: Prove that $x^{q-r}.y^{r-p}.z^{p-q}=1$.
3. Given $A=\{a,b,c\}$, $B=\{2,3\}$ find the number of relations from A to B.
4. Find the slope of the tangent of the curve $y=x^2$ at (1, 1).
5. Find the derivative of $y=(\log x)^x+(\text{Sin}^{-1}x)^{\text{Sin}x}$.

SET - 21

1. In ΔABC prove that $(a+b+c)\left[\text{Tan}\frac{A}{2}+\text{Tan}\frac{B}{2}\right]=2C\text{ Cot}\frac{C}{2}$.
2. Determine the sum of the sequence of the first '*n*' natural numbers.
3. Find the 10th term of the A.P : 2, 4, 6, ...
4. Find the equation of the normal to the curve $y=x^3$ at (2, 8).
5. Find the derivative of $\text{Sec}\,x$ from the first principle.

SET - 22

1. In ΔABC prove that

   1. b Cos B + c Cos C = a Cos (B – C)

   2. a Cos A + b Cos B = c Cos (A – B)

2. Determine the sum of the cubes of the first 'n' natural numbers.

3. Which term of the A.P. : 5, 11, 17, ... is 119 ?

4. Write the equation of the tangent of the curve $y = f(x)$ at the point (x, y).

5. If $y = e^{a \text{ Cos}^{-1}x}$. Show that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - a^2 y = 0$.

SET - 23

1. Prove that $\text{Tan}^{-1}\left(\frac{1}{2}\right) + \text{Tan}^{-1}\left(\frac{1}{5}\right) + \text{Tan}^{-1}\left(\frac{1}{8}\right) = \frac{n}{4}$.

2. Find the sum of first n terms of the series $1.2^2 + 2.3^2 + 3.4^2 + ...$

3. Find the sum of 2 + 4 + 6 + ... n terms.

4. Write the slope of x–axis.

5. Find $\frac{dy}{dx}$ if $y = \frac{\left(x^3+1\right)(x-2)}{x^2}$.

SET - 24

1. Prove that $\frac{\text{Sec } 8A - 1}{\text{Sec } 4A - 1} = \frac{\text{Tan } 8A}{\text{Tan } 2A}$.

2. Determine the sum of the n terms of the series 2.3.5 + 3.5.7 + 4.7.9 + ...

3. The Common difference of an A.P. is 3, and the 5^{th} term is 37. Find the first term.

4. Find the slope of normal to the curve $y = 2x^2 + \text{Cos } x$ at $x = 0$.

5. Evaluate $\underset{x \to 0}{Lt} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$

SET - 25

1. Prove that $\text{Cos}^3\text{A Sin 3A} + \text{Sin}^3\text{A Cos 3A} = \frac{3}{4}\text{Sin 4A}$.

2. Verify Rolle's Theorem for the junction $f(x) = x(x-1)(x-2),\ x \in [0,2]$.

3. Find the 6th term of the G.P. = 4,8,16, ...

4. Write the value of $\underset{x\to 0}{Lim}(1+x)^{\frac{1}{x}}$.

5. Find the derivative of $\frac{\text{Tan}^{-1}x}{1+\text{Tan}^{-1}x}$ *w.r.t* to $\text{Tan}^{-1}x$.

SET - 26

1. Check the applicability of Mean value theorem for $f(x) = 3x^2 - 4$ on [2,3].

2. Which term of the G.P. : 5, –10, 20, –40, ... is 320 ?

3. Write the Value of Lim $\theta \to 0$ $\frac{\text{Tan}\,\theta}{\theta}$.

4. Find $f'(0)$ is $f(x) = (5x-3)^7$.

5. Prove that Cos (A+B) = Cos A Cos B – Sin A Sin B.

SET - 27

1. Find the equation of the tangent and normal to the curve $x = a\ \text{Cos}^3\theta,\ y = a\ \text{Sin}^3\theta$ at $\theta =$

2. Find the sum of the G.P. = 1, 3, 9, 27, ..., up to the 10th term.

3. Write the value of Lim $x \to a$ $\frac{x^n - a^n}{x-a}$.

4. Find the equation of all lines having slope –4 that are tangents to the curves $y = \frac{1}{x-1}$.

5. Prove the following Tan 2 + 2 Tan 22 + 4 Tan 42 + 8 Cot 8d = Cot d.

SET - 28

1. Find the equation of the normalsto the curve $y = x^3 + 2x + 6$ which are parallel to the line $x + 14y + 4 = 0$.

2. Calculate the G.M. between $\frac{3}{2}$ and $\frac{27}{2}$.

3. Evaluate Lim $x \to 0$ $\frac{\text{Sin } 3x}{x}$.

4. Find the values of $\frac{\text{Cos } \pi}{12}$ and $\frac{\text{Cos } \pi}{24}$.

5. Find the derivatives of $f(x) = \frac{\text{Sin } x + \text{Cos } x}{\text{Sin } x - \text{Cos } x}$.

SET - 29

1. At what points on the curve $y = x^2 - 4x + 5$ is the tangent perpendicular to the line $2y + x - 7 = 0$.

2. Write the n^{th} term of the following series –2 + 4 – 6 + 8 – .....

3. Evaluate Lim $x \to 1$ $\frac{x^3 - 1}{x - 1}$.

4. Prove that $\frac{\text{Sin } 2A}{1 - \text{Cos } 2A} = \text{Cos A}$.

5. If $\text{Cos } y = x \text{ Cos } (a + y)$ prove that $\frac{dy}{dx} = \frac{\text{Cos}^2 (a + y)}{\text{Sin } a}$.

SET - 30

1. Find the equation of the tangent to the curve $y = x^2$ at (1, 1).

2. The distance travelled (in cm) by a simple pendulum in consecutive seconds are 16, 12, 9, ... How much distance will it travel before come into rest ?

3. Evaluate Lim $x \to 2[2(x + 3) + 7]$.

4. Show that $\text{Tan}^{-1}\left[\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right]=\frac{\pi}{4}+\frac{1}{2}\text{Cos}^{-1}(x^2)$.

5. Find the derivative of $y=(\log x)^x+(\text{Sin}^{-1}x)^{\text{Sin}\,x}$.

SET - 31

1. Find the equation of the normal to the curve $y=x^3$ at (2, 8).

2. So that the function $f(x)=\begin{cases}\frac{\text{Sin}\,x}{2}+\text{Cos}\,x, & x\neq 0,\\ 2, & x=0,\end{cases}$ is continuous at $x=0$.

3. Find $\frac{dy}{dx}$, if $y=5^x$.

4. Evaluate $\frac{dy}{dx}$ is $y=\frac{\left(4x^2-1\right)\left(1+x^2\right)^{\frac{1}{2}}}{x^3(x-1)^{\frac{3}{4}}}$.

5. The slope of normal to the curve $y=2x^2+\text{Cos}\,x$ at $x=0$.

SET - 32

1. Find the slope of the tangent of the curve $y=x^3-2x$ at $x=2$.

2. Determine the value of k so that the function $f(x)=\{kx^2, x\leq 2$ and $3, x>2$ is continuous at $x = 2$.

3. Find $f''(x)$, if $f(x)=4x^3-9-6x^2$.

4. Find the sum of 2+4+6+.....n terms.

5. Find the derivative of $y=(\log x)^x+(\text{Sin}^{-1}x)^{\text{Sin}\,x}$.

SET - 33

1. If $\text{Sin } y = x \text{ Sin } (a + y)$, prove that $\frac{dy}{dx} = \frac{\text{Sin}^2(a+y)}{\text{Sin } a}$.

2. Write the slope of the normal of the curve $x^2 + 3y + y^2 = 5$ at (1, 1).

3. Evaluate $\underset{x \to 1}{\text{Lim}} \left[\frac{1}{x} - 1 - \frac{2}{x^2} - 1 \right]$.

4. Prove that $\frac{\text{Sec } 8\text{A} - 1}{\text{Sec } 4\text{A} - 1} = \frac{\text{Tan } 8\text{A}}{\text{Tan } 2\text{A}}$.

5. The common difference of an A.P. is 3, and 5th term is 37. Find the first term.

SET - 34

1. If $y = \sqrt{\text{Sin } x} + \sqrt{\text{Sin } x} + ... + \infty$ prove that $\frac{dy}{dx} = \frac{\text{Cos } x}{2y - 1}$.

2. Find the equation of the tangent to the circle $x_2 + y_2 = 25$ at the point (4, 3).

3. $\text{Lim } x \to 0 \quad \frac{x}{\sqrt{1 + x - 1}} = ?$

4. Verify Roller's theorem for the function $f(x) = x(x-1)(x-2)\ x \in [0, 2]$.

5. Prove that $\text{Cos}(\text{A+B}) = \text{Cos A Cos B} - \text{Sin A Sin B}$.

SET - 35

1. Find $\frac{dy}{dx}$, if $y = x^x$.

2. State the Rolle's Theorem.

3. Prove that $\underset{x \to 0}{Lim} \left(\frac{e^x - 1}{x} \right) = 1$.

4. Prove that $\frac{\text{Sec } 8\text{A} - 1}{\text{Sec } 4\text{A} - 1} = \frac{\text{Tan } 8\text{A}}{\text{Tan } 2\text{A}}$.

5. Find the Tangent and normal to the curve $16x^2+9y^2=144$ at the point (x_1, y_1) where $y_1>0$ and $x_1=2$.

SET - 36

1. Show that the derivative of $\frac{\text{Tan}^{-1}2x}{1-x^2}$ with respect to $\frac{\text{Sin}^{-1}2x}{1+x^2}$ is 1.

2. State the Lagranges Mean Value theorem.

3. Evaluate $\underset{x\to 0}{Lim}\ \frac{\text{Sin } 7x}{2x}$.

4. Find the general solution of the following $2\ \text{Sin}^2\theta+\sqrt{3}\ \text{Cos}\ \theta+1=0$.

5. If x, y, z and p^{th} , q^{th} and r^{th} terms of a G.P. prove that $x^{q-r}.y^{r-p}.z^{p-q}=1$.

SET - 37

1. If $y=\left[\text{Cos}^{-1}(x)\right]^2$ show that $\left(1-x^2\right)y_2-xy_1-2=0.$

2. Find the slope of the tangent to the curve $y=\sqrt{x}$ at $x=9.$

3. Find the value of $\underset{x\to 2}{Lim}\ \frac{(x-2)}{|x-2|}$.

4. Find the sum upto 'n' terms of the sequence 0.7, 0.77, 0.777, ...

5. At what points on the curve $y=x^2-4x+5$ is the tangent perpendicular to the line $2y+x-7=0$.

SET - 38

1. If $x^y=e^{x-y}$, prove that $\frac{dy}{dx}=\frac{\log x}{\left(1+\log_3 x\right)^2}$.

2. Find the slope of the normal to the curve $y=x^3+x$ at $x=2.$

3. Evaluate $\underset{x\to\pi}{Lim}\ \dfrac{\text{Sin}\, x}{\pi - x}$.

4. These numbers are in lip their sum is 43, and their product is 216. Find the numbers in proper order.

5. Find the equation of the tangent and normal to the curve $x = a\ \text{Cos}^3\theta,\ y = a\ \text{Sin}^3\theta$ at $\theta = \dfrac{\pi}{4}$.

SET - 39

1. Find the slope of the tangent of the curve $x = a(\theta - \text{Sin}\,\theta),\ y = a(1 - \text{Cos}\,\theta)$ at $\theta = \dfrac{\pi}{2}$.

2. Prove that $\underset{x\to 0}{Lim}\ \dfrac{\log(1+x)}{x} = 1$.

3. If $A = \{x : x \in z^+ \le 5\},\ B = \{y : y \text{ is a prime no. less than } 10\}$ represent $A \cup B$ using Venn diagram.

4. Define a singleton set.

5. Find 7'(0) if $f(x) = 16x + 2$.

SET - 40

1. Test the continuity of function $f(x)$ at origin where $f(x) = \begin{cases} \dfrac{x}{|x|}, x \neq 0 \text{ and } 1, x = 0 \end{cases}$.

2. Prove that Cos (A+B) = Cos A Cos B – Sin A Sin B.

3. If $A = \{2,4,6,5,8,10\},\ B = \{8,10,12,14\},\ C = \{14,16,18,20\}$ find

   a) $A \cup (B \cup C)$ b) $A \cap (B \cap C)$

4. What is meant by Disjoint sets ?

5. Find $f'(0)$ is $f(x) = (5\times -3)^7$.

SET - 41

1. Evaluate $\underset{\theta\to 0}{Lim}\ \frac{1-\text{Cos } 4\theta}{1-\text{Cos } 6\theta}$.

2. Prove that $\text{Cos } \frac{\pi}{9}\ \text{Cos } \frac{2\pi}{9}\ \text{Cos } \frac{3\pi}{9}\ \text{Cos } \frac{4\pi}{9} = \frac{1}{16}$.

3. Find the domain of the following functions $y = \frac{1}{(x+2)(x-3)}$.

4. If $A = \{a, e, i, o, u\}$ and $B = \{e, i, o, u, a\}$ is $A \subseteq B$ or $B \subseteq A$ or Both.

5. Find derivatives of second order of the function x^3.

SET - 42

1. Evaluate $\underset{\theta\to 0}{Lim}\ \text{Sin}\left(\frac{3\theta}{\theta}\right)$.

2. If $A = \frac{\pi}{6}$ then verify the following

$$\text{Cos } 2A = \text{Cos}^2 A - \text{Sin}^2 A = 2\text{Cos}^2 A - 1 = 1 - 2\ \text{Sin}^2 A = \frac{1-\text{Tan}^2 A}{1+\text{Tan}^2 A}.$$

3. Find the power set of $A = \left\{x : x \in R \text{ and } x^2 + 7 = 0\right\}$

4. If $f(x) = e^x + 2\ \text{Cos } x$ then find $f'(x)$.

5. If $f(x) = x^2,\ -3 \le x \le 3$ find its range.

SET - 43

1. $\underset{x\to 0}{Lim} \frac{x}{1+x-1}$.

2. If $f(x) = x^3$ and $g(x) = \frac{1}{x}$ $f : R \to R$ and $g : R - [0]$ then find *fog*.

3. Find the sum of the G.P. 1,3,9,27,..... up to the 10^{th} form.

4. Find the area of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

5. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\text{Sin } x}{\text{Sin } x+\text{Cos } x}dx$.

SET - 44

1. $\lim_{x\to 0} \frac{x^2-25}{x+5}$.

2. With the general solution of the equation $\text{Sin } \theta = 0$.

3. In any Δ ABC S.T $\frac{\text{Cos A}}{a}+\frac{\text{Cos B}}{b}+\frac{\text{Cos C}}{c}=\frac{a^2+b^2+c^2}{2ab}$.

4. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\text{Sin } x}}{\sqrt{\text{Sin } x}+\sqrt{\text{Cos } x}}dx$.

5. Verify Rolle's theorem for the function $f(x)=x(x-1)(x-2)x\in(0,2)$.

SET - 45

1. Prove that $\text{Tan}^{-1}\left(\frac{1}{2}\right)+\text{Tan}^{-1}\left(\frac{1}{5}\right)+\text{Tan}^{-1}\left(\frac{1}{8}\right)=\frac{\pi}{4}$.

2. Determine the sum of the *n* terms of the series 2.3.5 + 3.5.7 + 4.7.9 + ...

3. Find the derivate of $\frac{\text{Tan}^{-1}x}{1+\text{Tan}^{-1}x}$ w.r. to $\text{Tan}^{-1}x$.

4. Check the applicability of mean value theorem for $f(x)=3x^2-4$ on [2,3].

5. Find local maximum and local minimum of the function $f(x)=\frac{x}{1+x^2}$.

SET - 46

1. Solve $(1+y^2)\frac{dx}{dy} = \text{Tan}^4 y - x$.

2. Find $\int_0^{\frac{\pi}{4}} \log(1+\text{Tan}\, x)dx$.

3. In Δ ABC prove that $\frac{b^2-c^2}{a^2}\text{Sin 2A} + \frac{c^2-a^2}{b^2}\text{Sin 2B} + \frac{a^2-b^2}{c^2}\text{Sin 2C} = 0$.

4. Find the sum of the G.P. 1,3,9,27.... up to the 10^{th} term.

5. Find the equation of the normals to the curve $y = x^3 + 2x + 6$ which are parallel to the line $x + 14y - 4 = 0$.

SET - 47

1. Solve $(1+x^2)\frac{dy}{dx} + y = \text{Tan}^{-1}x$.

2. Evaluate $\int_0^{\pi} \frac{1}{5+3\,\text{Cos}\,\theta} d\theta$.

3. In Δ ABC prove that $(a+b+c)\left[\frac{\text{Tan A}}{2} + \frac{\text{Tan B}}{2}\right] = \frac{2\text{C Cot C}}{2}$.

4. Calculate the G.M between $\frac{3}{2}$ and $\frac{27}{2}$.

5. Find the equation of the Tangent and normal to the curve $x = a\,\text{Cos}^3\theta,\ y = a\,\text{Sin}^3\theta$ at $\theta = \frac{\pi}{4}$.

SET - 48

1. Find the particular solution of $\frac{dy}{dx} = \frac{2x}{3y^2+1}$.

2. Find the area common to two parabolas $x^2 = 4ay$ and $y^2 = 4ax$.

3. In Δ ABC prove that (i) b Cos B + c Cos C = a Cos (B–C)
   (ii) a Cos A + b Cos B = c Cos (A–B)

4. Write the n^{th} term of the following series
   –2 + 4 – 6 + 8 .....

5. The distance travelled (in cm) by a simple pendulum in consecutive seconds are 16, 12, 9.... How much distance will it travel before it came into rest ?

SET - 49

1. Check the applicability of clean value theorem for $f(x) = 3x^2 - 4$ on [2, 3].

2. Find $\frac{dy}{dx}$ if $y = e^x \log x$.

3. The first term of an A.P. is 10, the last term is 50. If the sum of all the terms is 480. Find the common difference and the number of terms.

4. Prove that $\frac{\text{Sec } 8A - 1}{\text{Sec } 4A - 1} = \frac{\text{Tan } 8A}{\text{Tan } 2A}$.

5. What are the maximum and minimum values of Sin θ in $[0,2\pi]$.

SET - 50

1. Prove that $\text{Cos}^3\text{A Sin 3A} + \text{Sin}^3\text{A Cos 3A} = \frac{3}{4}\text{ Sin 4A}$

2. Find the derivative of the function $y = \log\left[\frac{a + b\text{ Tan } x}{a - b\text{ Tan } x}\right]$

3. Verify Roller's Theorem for the function $y(x) = x(x-1)(x-2),\ x \in [0,2]$.

4. Determine the sum of the n terms of the series 2.3.5 + 3.5.7 + 4.7.9 + ...

5. What are the maximum and minimum values of Sin θ in $[0,2\pi]$.

A.P. OPEN SCHOOL SOCIETY - HYDERABAD

INTERMEDIATE (APOSS)

Subject : MATHEMATICS

TUTOR MARKED ASSIGNMENT - III

SET - 1

1. Show that the function $f(x)=\left\{\frac{\text{Sin } x}{x}+\text{Cos } x,\ x\neq 0,\ 2,\ x=0\right\}$ is continuous at $x = 0$.

2. If $y=\text{Tan}^{-1}x$, show that $(1+x)^2 y_2+2xy_1=0$.

3. Find $\int_0^1 \frac{1}{\sqrt{1-x^2}}dx$.

4. If $y=\frac{\left(x^3+1\right)(x-2)}{x^2}$ evaluate $\frac{dy}{dx}$.

5. Write the sample space in two tosses of a coin.

SET - 2

1. Evaluate $\int_0^{\frac{\pi}{2}} \log(\text{Sin } x)\,dx$.

2. Solve $\text{Sin } x\frac{dy}{dx}+y\ \text{Cos } x=2\ \text{Sin}^2 x\ \text{Cos } x$.

3. Find the slope of the tangent of the curve $y=x^2$ at (1, 1).

4. State the Roll's theorem.

5. Out of 21 tickets with numbers from 1 to 21. Three are drawn at random. Find the probability that the numbers on them are in A.P.

SET - 3

1. Find the slope of the tangent of the curve $x = a(\theta - \text{Sin}\,\theta)$, $y = a(1 - \text{Cos}\,\theta)$ at $\theta = \frac{\pi}{2}$.

2. Find the equation of the normal to the curve $y = x^3$ at (2, 8).

3. Find $\int \text{Tan}^2 x\, dx$.

4. Evaluate $\int \frac{dx}{\text{Sin}\,x - \text{Cos}\,x}$.

5. Find $\underset{x \to 0}{Lim} \frac{x}{\sqrt{1+x}-1} = ?$

SET - 4

1. If $y = 5^x$, find $\frac{dy}{dx}$.

2. Evaluate $\underset{x \to 0}{Lim} \frac{\text{Sin}\,3x}{x}$.

3. Find the slope of the tangent of the curve $y = x^2$ at (1, 1).

4. Write the value of $\int \frac{1}{x} dx$.

5. Calculate the mean deviation for the following data of marks detained by 40 students in a test.

Marks	20	30	40	50	60	70	80	90	100
No. of Students	2	4	8	10	8	4	2	1	1

SET - 5

1. Find the slope of x-axis.

2. Find the equation of the normal to the curve $y = x^3$ at (2, 8).

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

4. Find the value of $\int \text{Cot}\, x\, dx$.

5. Define range with an example.

SET - 6

1. Solve $\left(1+x^2\right)\frac{dy}{dx}+y=\text{Tan}^{-1}x$.

2. If $y=e^{a\ \text{Cos}^{-1}x}$, show that $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}-a^2y=0$.

3. Find the derivative of x^2 from the first principle.

4. Find the derivative of the function $\frac{ax+b}{cx+d}$.

5. If $y=\text{Cos}^{-1}\frac{1}{x}$ find $\frac{dy}{dx}$.

SET - 7

1. If two dice are thrown, what is the probability that the sum of the numbers on the two faces is divisible by 3 or by 4 ?

2. If Sin y = x Sin (a + y), prove that $\frac{dy}{dx}=\frac{\text{Sin}^2\left(a+y\right)}{\text{Sin}\, a}$.

3. Show that $\int_0^{\pi}\frac{x}{1+\text{Sin}\, x}dx=\pi$.

4. If a card is selected from a well shuffled deck of 52 cards, what is the probability of drawing

   1. A spade
   2. A king
   3. A king of spade

5. If $f(x)=4x^2-9-6x^2$ find $f'(x)$.

SET - 8

1. If Sin y = x Sin $(a+y)$, prove that $\frac{dy}{dx} = \frac{\text{Sin}^2(a+y)}{\text{Sin } a}$.

2. Evaluate $\int_0^{\pi} \frac{1}{5+3\ \text{Cos}\ \theta} d\theta$.

3. If $y = x^{x \cdot x^{x \cdot x^{\cdots \infty}}}$ show that $x\frac{dy}{dx} = \frac{y^2}{1 - y\ \log x}$.

4. Define mutually exclusive events with an example.

5. From a bag containing 15 red and 10 blue balls, a ball is drawn 'at random' what is the probability of drawing 1) a red ball, 2) a blue ball.

SET - 9

1. If $y = x^x$ find $\frac{dy}{dx}$.

2. Write the order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right) + y = 0$.

3. Find the differential equation of all straight lines passing through the point (3, –2).

4. Find $\int_0^a e^x dx$.

5. The daily salaries of 30 workers are given below:

Daily salary (Rs.)	0-50	50-100	100-150	150-200	200-250	250-300
No. of workers	3	4	5	7	8	3

SET - 10

1. If $f(x) = 16x + 2$ find $f'(0)$.

2. Find the second order derivation of x^3.

3. If $y = \log\sqrt{x}$ find $\frac{dy}{dx}$.

4. A and B are two mutually exclusive events such that P(A) = 0.3 and P(B) = 0.4 calculate P (A or B).

5. Find the variance of the data 4, 7, 9, 10, 11, 13, 16.

SET - 11

1. Find $\underset{x\to 0}{Lim}\frac{x}{\sqrt{1+x}-1} = ?$

2. Solve $\text{Sin}\, x\frac{dy}{dx} + y\ \text{Cos}\, x = 2\ \text{Sin}^2 x\ \text{Cos}\, x$.

3. Out of 21 tickets with numbers from 1 to 21. Three are drawn at random. Find the probability that the numbers on them are in A.P.

4. Evaluate $\int\frac{dx}{\text{Sin}\, x - \text{Cos}\, x}$.

5. Find the slope of the tangent of the curve $y = x^2$ at (1, 1).

SET - 12

1. If $y = 5^x$, find $\frac{dy}{dx}$.

2. Calculate the mean deviation for the following data of marks detained by 40 students in a test.

Marks	20	30	40	50	60	70	80	90	100
No. of Students	2	4	8	10	8	4	2	1	1

3. Find the slope of x-axis.

4. Write the value of $\int\frac{1}{x}dx$.

5. Define range with an example.

SET - 13

1. Show that the function $f(x)=\left\{\frac{\text{Sin } x}{x}+\text{Cos } x,\ x\neq 0,\ 2,\ x=0\right\}$ is continuous at $x = 0$.

2. Find the equation of the normal to the curve $y=x^3$ at (2, 8).

3. Find the slope of the tangent of the curve $y=x^2$ at (1, 1).

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

5. Evaluate $\underset{x\to 0}{Lim}\frac{\text{Sin } 3x}{x}$.

SET - 14

1. Find $\int \text{Tan}^2 x\ dx$.

2. If $y=\text{Tan}^{-1}x$, show that $(1+x)^2 y_2+2xy_1=0.$

3. Write the sample space in two tosses of a coin.

4. State the Roll's theorem.

5. Find the value of $\int \text{Cot } x\ dx$.

SET - 15

1. Solve $\left(1+x^2\right)\frac{dy}{dx}+y=\text{Tan}^{-1}x$.

2. Find the derivative of x^2 from the first principle.

3. Find the derivative of the function $\frac{ax+b}{cx+d}$.

4. If $y=\text{Cos}^{-1}\frac{1}{x}$ find $\frac{dy}{dx}$.

5. If $f(x)=4x^2-9-6x^2$ find $f'(x)$.

SET - 16

1. Find $\int_0^1 \frac{1}{\sqrt{1-x^2}}\,dx$.

2. If $y=\frac{\left(x^3+1\right)\left(x-2\right)}{x^2}$ evaluate $\frac{dy}{dx}$.

3. Evaluate $\int_0^{\frac{\pi}{2}} \log\left(\text{Sin } x\right)dx$.

4. Find the slope of the tangent of the curve $x=a\left(\theta-\text{Sin }\theta\right)$, $y=a\left(1-\text{Cos }\theta\right)$ at $\theta=\frac{\pi}{2}$.

5. Find the equation of the normal to the curve $y=x^3$ at (2, 8).

SET - 17

1. If $y=e^{a\ \text{Cos}^{-1}x}$, show that $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}-a^2y=0$.

2. Evaluate $\int_0^{\pi} \frac{1}{5+3\ \text{Cos }\theta}\,d\theta$.

3. From a bag containing 15 red and 10 blue balls, a ball is drawn 'at random' what is the probability of drawing 1) a red ball, 2) a blue ball.

4. The daily salaries of 30 workers are given below:

Daily salary (Rs.)	0-50	50-100	100-150	150-200	200-250	250-300
No. of workers	3	4	5	7	8	3

5. If $f(x)=16x+2$ find $f'(0)$.

SET - 18

1. If $y = x^{x^{x^{x^{\cdots\infty}}}}$ show that $x\frac{dy}{dx} = \frac{y^2}{1 - y \log x}$.

2. Find the differential equation of all straight lines passing through the point (3, –2).

3. Find $\int_0^a e^x dx$.

4. If two dice are thrown, what is the probability that the sum of the numbers on the two faces is divisible by 3 or by 4 ?

5. If Sin y = x Sin (a + y), prove that $\frac{dy}{dx} = \frac{\text{Sin}^2(a+y)}{\text{Sin } a}$.

SET - 19

1. A and B are two mutually exclusive events such that P(A) = 0.3 and P(B) = 0.4 calculate P (A or B).

2. Find the variance of the data 4, 7, 9, 10, 11, 13, 16.

3. If $y = \log\sqrt{x}$ find $\frac{dy}{dx}$.

1. Solve $(1+x^2)\frac{dy}{dx} + y = \text{Tan}^{-1}x$.

5. Find the second order derivation of x^3.

SET - 20

1. Show that $\int_0^{\pi} \frac{x}{1+\text{Sin } x} dx = \pi$.

2. If a card is selected from a well shuffled deck of 52 cards, what is the probability of drawing

    1. A spade
    2. A king
    3. A king of spade

3. If Sin y = x Sin $(a+y)$, prove that $\frac{dy}{dx} = \frac{\text{Sin}^2(a+y)}{\text{Sin } a}$.

4. Define mutually exclusive events with an example.

5. Evaluate $\underset{x \to 0}{Lim} \frac{\text{Sin } 3x}{x}$.