Important Questions

1. Matrices and Determinants

2 Mark Questions

Ex.1.1 (2)	Find the values of x, y, z if $\begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2a \end{bmatrix}$
Ex 1.1 (3)	If $\begin{bmatrix} 2x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix}$ find x, y, z, w
Ex 1.1 (13)	Find matrix C if $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & -1 \end{bmatrix}$ and$5C + 2B = A$
Example 1.10	Solve for x, if $\begin{vmatrix} x & 5 \\ 7 & x \end{vmatrix} + \begin{vmatrix} 1 & -2 \\ -1 & 1 \end{vmatrix} = 0$
Ex 1.2 (3)	Solve: (i) $\begin{vmatrix} 2 & x & 4 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{vmatrix} = -3$ (ii) $\begin{vmatrix} 4 & 3 & 9 \\ 3 & -2 & 7 \\ 4 & 4 & x \end{vmatrix} = -1$
Example 1.27	Prove that $\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}^2 = \begin{vmatrix} a_1^2 + a_2^2 & a_1b_1 + a_2b_2 \\ a_1b_1 + a_2b_2 & b_1^2 + b_2^2 \end{vmatrix}$

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Example 1.4	If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, find $A^2 - 7A - 2I$
Ex 1.1 (8)	If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ find k so that $A^2 = kA - 2I$
Example 1.14	Prove that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$
Ex 1.2 (5)	Prove that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$
Ex 1.2 (7)	Prove that $\begin{vmatrix} 1 & a & a^3 \\ 1 & b & b^3 \\ 1 & c & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$
Ex 1.2 (10) (iv)	Prove that $\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} = a^3 + b^3 + c^3 - 3abc$
Ex 1.3 (1)	Using factor method show that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$
Example 1.29	If A_1, B_1, C_1 are the co-factors of a_1, b_1, c_1 in $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$, then show that $\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix} = \Delta^2$

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Example 1.5	If $A=\begin{bmatrix}1&4\\0&3\end{bmatrix}$ and $B=\begin{bmatrix}5&0\\3&9\end{bmatrix}$, show that $(A+B)^2\neq A^2+2AB+B^2$
Ex 1.1 (5)	Given $A=\begin{bmatrix}1&2&3\\-1&3&4\\2&0&-1\end{bmatrix}$, $B=\begin{bmatrix}2&0&1\\2&-1&-2\\1&1&-1\end{bmatrix}$ and $C=\begin{bmatrix}1&1&-1\\2&1&-2\\1&-1&1\end{bmatrix}$ Verify the following results (i) $AB\neq BA$ (ii) $(AB)C=A(BC)$ (iii) $A(B+C)=AB+AC$
Ex 1.1 (6)	Solve: $2X+Y+\begin{bmatrix}-2&1&3\\5&-7&3\\4&5&4\end{bmatrix}=O, X-Y=\begin{bmatrix}4&7&0\\-1&2&-6\\-2&8&-5\end{bmatrix}$
Ex 1.1 (7)	If $A=\begin{bmatrix}3&-5\\-4&2\end{bmatrix}$ show that $A^2-5A-14I=O$ where is I the unit matrix of order 2
Ex 1.1 (9)	If $A=\begin{bmatrix}1&2&2\\2&1&2\\2&2&1\end{bmatrix}$, Show that $A^2-4A-5I=O$
Example 1.19	Prove that $\begin{vmatrix}a^2+\lambda&ab&ac\\ab&b^2+\lambda&bc\\ac&bc&c^2+\lambda\end{vmatrix}=\lambda^2(a^2+b^2+c^2+\lambda)$
Ex 1.2 (6)	Prove that $\begin{vmatrix}1+a&1&1\\1&1+b&1\\1&1&1+c\end{vmatrix}=abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$ where a,b,c are non zero real numbers and hence evaluate the value of $\begin{vmatrix}1+a&1&1\\1&1+a&1\\1&1&1+a\end{vmatrix}$
Example 1.21	Prove by factor method $\begin{vmatrix}1&a^2&a^3\\1&b^2&b^3\\1&c^2&c^3\end{vmatrix}=(a-b)(b-c)(c-a)(ab+bc+ca)$
Example 1.22	Prove that $\begin{vmatrix}(b+c)^2&a^2&a^2\\b^2&(c+a)^2&b^2\\c^2&c^2&(a+b)^2\end{vmatrix}=2abc(a+b+c)^3$
Ex 1.3 (5)	Show that $\begin{vmatrix}b+c&a&a^2\\c+a&b&b^2\\a+b&c&c^2\end{vmatrix}=(a+b+c)(a-b)(b-c)(c-a)$
Example 1.28	Show that $\begin{vmatrix}2bc-a^2&c^2&b^2\\c^2&2ca-b^2&a^2\\b^2&a^2&2ab-c^2\end{vmatrix}=\begin{vmatrix}a&b&c\\b&c&a\\c&a&b\end{vmatrix}^2$
Ex 1.4 (2)	Show that $\begin{vmatrix}1&x&x^2\\1&y&y^2\\1&z&z^2\end{vmatrix}\begin{vmatrix}a^2&1&2a\\b^2&1&2b\\c^2&1&2c\end{vmatrix}=\begin{vmatrix}(a-x)^2&(b-x)^2&(c-x)^2\\(a-y)^2&(b-y)^2&(c-y)^2\\(a-z)^2&(b-z)^2&(c-z)^2\end{vmatrix}$

2. Vector Algebra

2 Mark Questions

Ex 2.1 (5)	If D is the mid-point of the side BC of a triangle ABC, prove that $\overrightarrow{AB}+\overrightarrow{AC}=2\overrightarrow{AD}$
Ex 2.1 (6)	If G is the centroid of a triangle ABC, prove that $\overrightarrow{GA}+\overrightarrow{GB}+\overrightarrow{GC}=\vec{O}$
Ex 2.1 (7)	If ABC and $A'B'C'$ are two triangles and G, G' be their corresponding centroids, prove that $\overrightarrow{AA'}+\overrightarrow{BB'}+\overrightarrow{CC'}=3\overrightarrow{GG'}$
Example.2.16	Find the unit vector in the direction of $3\vec{i}+4\vec{j}-12\vec{k}$
Example.2.17	Find the sum of the vectors $\vec{i}-\vec{j}+2\vec{k}$ and $2\vec{i}+3\vec{j}-4\vec{k}$ and also find the modulus of the sum.
Example. 2.18	If the position vectors of the two points A and B are $\vec{i}+2\vec{j}-3\vec{k}$ and $2\vec{i}-4\vec{j}+\vec{k}$ respectively then find $\lvert\overrightarrow{AB}\rvert$
Example. 2.19	Find the unit vectors parallel to the vector $-3\vec{i}+4\vec{j}$
Example.2.20	Find the vectors of magnitude 5 units, which are parallel to the vector $2\vec{i}-\vec{j}$
Ex 2.2 (5)	If the vectors $\vec{a}=2\vec{i}-3\vec{j}$ and $\vec{b}=-6\vec{i}+m\vec{j}$ are collinear, find the value of m
Ex 2.2 (6)	Find a unit vector in the direction $\vec{i}+\sqrt{3}\vec{j}$

3 Mark Questions

Theorem 2.7 (Section Formula)	Let A and B be two points with position vectors $\vec{a}$ and $\vec{b}$ respectively and let P be a point dividing AB internally in the ratio $m:n$. Then the position vector of P is given by $\overrightarrow{OP}=\frac{m\vec{b}+n\vec{a}}{m+n}$
Example.2.7	In a triangle ABC if D and E are the midpoints of sides AB and AC respectively, show that $\overrightarrow{BE}+\overrightarrow{DC}=\frac{3}{2}\overrightarrow{BC}$
Example 2.8	Prove that the line segment joining the mid-points of two sides of a triangle is parallel to the third side and equal to half of it.
Example 2.11	Show that the points with position vectors $\vec{a}-2\vec{b}+3\vec{c}, -2\vec{a}+3\vec{b}-\vec{c}, 4\vec{a}-7\vec{b}+7\vec{c}$ are collinear.
Ex 2.1 (3)	Show that the points with position vectors $\vec{a}-2\vec{b}+3\vec{c}, -2\vec{a}+3\vec{b}+2\vec{c}$ and $-8\vec{a}+13\vec{b}$ are collinear.
Ex 2.1 (8)	Prove that the sum of the vectors directed from the vertices to the mid-points of opposite sides of a triangle is zero.
Ex 2.1 (12)	If $ABCD$ is a quadrilateral and E and F are the mid-points of AC and BD respectively, prove that $\overrightarrow{AB}+\overrightarrow{AD}+\overrightarrow{CB}+\overrightarrow{CD}=4\overrightarrow{EF}$.
Ex 2.2 (2)	If $\vec{a}=3\vec{i}-\vec{j}-4\vec{k}$, $\vec{b}=-2\vec{i}+4\vec{j}-3\vec{k}$ and $\vec{c}=\vec{i}+2\vec{j}-\vec{k}$ find $\lvert 2\vec{a}-\vec{b}+3\vec{c}\rvert$
Ex 2.2 (4)	Show that the point whose position vectors given by (i) $-2\vec{i}+3\vec{j}+5\vec{k}$, $\vec{i}+2\vec{j}+3\vec{k}, 7\vec{i}-\vec{k}$ are collinear (ii) $\vec{i}-2\vec{j}+3\vec{k}, 2\vec{i}+3\vec{j}-4\vec{k}, -7\vec{j}+10\vec{k}$ are collinear.
Ex 2.2 (13)	If the position vectors of P and Q are $\vec{i}+3\vec{j}-7\vec{k}$ and $5\vec{i}-2\vec{j}+4\vec{k}$, find $\overrightarrow{PQ}$ and determine its direction cosines

5 Mark Questions

Theorem 2.8	The medians of a triangle are concurrent.
Ex 2.1 (10)	Prove by vector method that the internal bisectors of the angles of a triangle are concurrent.
Ex 2.2 (9)	The vertices of a triangle have position vectors $4\vec{i}+5\vec{j}+6\vec{k}$, $5\vec{i}+6\vec{j}+4\vec{k}$, $6\vec{i}+4\vec{j}+5\vec{k}$ Prove that the triangle is equilateral.
Ex 2.2 (10)	Show that the vectors $2\vec{i}-\vec{j}+\vec{k}, 3\vec{i}-4\vec{j}-4\vec{k}, \vec{i}-3\vec{j}-5\vec{k}$ form a right angled triangle.
Ex 2.2 (11)	Prove that the points $2\vec{i}+3\vec{j}+4\vec{k}, 3\vec{i}+4\vec{j}+2\vec{k}, 4\vec{i}+2\vec{j}+3\vec{k}$ form an equilateral triangle.
Ex 2.2 (12)	If the vertices of a triangle have position vectors $\vec{i}+2\vec{j}+3\vec{k}, 2\vec{i}+3\vec{j}+\vec{k}, 3\vec{i}+\vec{j}+2\vec{k}$ find the position vector of its centroid.
Ex 2.2 (14)	Show that the following vectors are coplanar (i) $\vec{i}-2\vec{j}+3\vec{k}, -2\vec{i}+3\vec{j}-4\vec{k}, -\vec{j}+2\vec{k}$ (ii) $5\vec{i}+6\vec{j}+7\vec{k}, 7\vec{i}-8\vec{j}+9\vec{k}, 3\vec{i}+20\vec{j}+5\vec{k}$
Ex 2.2 (15)	Show that the points given by the vectors $4\vec{i}+5\vec{j}+\vec{k}, -\vec{j}-\vec{k}, 3\vec{i}+9\vec{j}+4\vec{k}$ and $-4\vec{i}+4\vec{j}+4\vec{k}$ are coplanar.
Ex 2.2 (16)	Examine whether the vectors $\vec{i}+3\vec{j}+\vec{k}, 2\vec{i}-\vec{j}-\vec{k}, 7\vec{j}+5\vec{k}$ and are coplanar

3. Algebra

2 Mark Questions

Ex 3.2 (11)	In how many ways can an examinee answer a set of 5 true / false type questions?
Theorem 3.2	Let r and n be positive integers such that $1 \le r \le n$. Then $nP_r = \frac{n!}{(n-r)!}$
Example: 3.16	Evaluate $8P_3$
Example:3.18	If $nP_4 = 360$, find the value of n
Example: 3.19	If $9P_r = 3024$ find r
Example:3.20	If $(n-1)P_3 : nP_4 = 1:9$. find n
Example: 3.27	How many arrangements can be made with the letters of the word "MATHEMATICS" ?
Ex 3.3 (2)	If $nP_4 = 20.nP_3$ find n
Ex 3.3 (3)	If $10P_r = 5040$, find the value of r
Ex 3.3(15)	In how many ways can 8 students are seated in (i) line (ii) circle?
Example:3.35	If $nC_4 = nC_6$, find $12C_n$
Ex 3.4 (2)	If $nC_{10} = nC_{12}$ find $23C_n$
Ex 3.4 (3)	If $8C_r - 7C_3 = 7C_2$, find r
Ex 3.4 (4)	If $16C_4 = 16C_{r+2}$, find rC_2
Ex 3.4 (5)	(i) $2.nC_3 = \frac{20}{3}\ nC_2$ find n.
Ex 3.4 (5)	(ii) $nC_{(n-4)} = 70$ find n.
Ex 3.6 (2)	Prove by Mathematical Induction $2+4+6+8+\cdots+2n = n(n+1)$
Ex 3.7(1) (i)	Expand the following by using binomial theorem $(3a+5b)^5$

3 Mark Questions

Example.3.1	Resolve into partial fractions $\frac{3x+7}{x^2-3x+2}$
Example.3.3	Resolve into partial fractions $\frac{9}{(x-1)(x+2)^2}$
Ex 3.1 (3)	Resolve into partial fractions $\frac{x^2+x+1}{(x-1)(x-2)(x-3)}$
Example. 3.11	There are 6 multiple choice questions in an examination . How many sequences of answers are possible. If the first three questions have 4 choices each and the next three have 5 each?
Ex 3.2 (6)	There are 6 multiple choice questions in an examination . How many sequences of answers are possible. If the first three questions have 4 choices each and the next three have 2 each?
Example.3.17	If $5P_r = 6P_{r-1}$, find r
Ex 3.3 (4)	If $56P_{r+6}: 54P_{(r+3)} = 30800: 1$, find r
Ex 3.3 (5)	If P_m stands for mP_m , then prove that $1 + 1.P_1 + 2.P_2 + 3.P_3 + \cdots n.P_n = (n+1)!$
Ex 3.3 (11)	How many different words can be formed with the letters of the word 'MISSISSIPPI' ?
Example.3.36	If $15C_r: 15C_{(r-1)} = 11: 5$ find r
Ex 3.5(9)	From a class of 25 students, 10 are to be chosen for an excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can they be chosen?
Example.3.56.	Find the coefficient of x^5 in the expansion of $\left(x + \frac{1}{x^3}\right)^{17}$
Example.3.57.	Find the constant term in the expansion of $\left(\sqrt{x} - \frac{2}{x^2}\right)^{10}$
Ex 3.7 (2) (i)	Evaluate. $(\sqrt{2}+1)^5 + (\sqrt{2}-1)^5$

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Example.3.5	Resolve into partial fractions $\frac{x^2+x+1}{x^2-5x+6}$
Ex 3.1 (2)	Resolve into partial fractions $\frac{7x-1}{6-5x+x^2}$
Ex 3.1 (12)	Resolve into partial fractions $\frac{x^2+x+1}{x^2+2x+1}$
Ex 3.4 (6)	If $(n+2)C_8: (n-2)P_4 = 57: 16$ find n
Ex 3.4 (7)	If $28C_{2r}: 24C_{(2r-4)} = 225: 11$ find r.
Example.3.49	Prove by Mathematical Induction $1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}, n \in N$
Example.3.50	Prove by Mathematical Induction $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}, n \in N$.
Example.3.52	Prove by Mathematical induction $2^{3n} - 1$ is divisible by 7, for all natural numbers n
Ex 3.6 (6)	Prove by Mathematical induction $1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4}$
Ex 3.6 (9)	Prove by Mathematical induction $5^{2n} - 1$is divisible by 24 for all $n \in N$
Ex 3.6 (13)	Prove by Mathematical induction $7^{2n} + 16n - 1$ is divisible by 64
Ex 3.7 (7)	Find the coefficient of x^5 in the expansion of $\left(x - \frac{1}{x}\right)^{11}$
Ex 3.7 (8)(i)	Find the term independent of x (constant term) in the expansion of $\left(2x^2 + \frac{1}{x}\right)^{12}$

Ex 3.7(8)(ii)	Find the term independent of x (constant term) in the expansion of $\left(\frac{4x^2}{3}-\frac{3}{2x}\right)^9$
Ex 3.7(8)(iii)	Find the term independent of x (constant term) in the expansion of $\left(9x-\frac{b}{cx^2}\right)^{17}$

4. Sequence and series

2 Mark Questions

Ex.4.1 (1) (i)	Write the first 5 terms $a_n=(-1)^{n-1}5^{n+1}$
Ex.4.1 (1) (ii)	Write the first 5 terms $a_n=\frac{n(n^2+5)}{4}$
Ex.4.1 (1) (iii)	Write the first 5 terms $a_n=-11n+10$
Ex 4.1 (1) (iv)	Write the first 5 terms $a_n=\frac{n+1}{n+2}$
Ex 4.1 (1) (v)	Write the first 5 terms $a_n=\frac{1-(-1)^n}{3}$
Ex 4.1 (1) (vi)	Write the first 5 terms $a_n=\frac{n^2}{3^n}$
Ex 4.2 (4)	The first and second terms of a H.P are $\frac{1}{3}$ and $\frac{1}{5}$ respectivley, find the 9th term

3 Mark Questions

Ex 4.1(2)(iii)	$a_n=\frac{(n+1)^2}{n}$ then find a_7, a_{10}
Example.4.3	If the 5th and 12th terms of a H.P are 12 and 5 respectively, find the 15th term
Example.4.6	Insert four AM's between -1 and 14
Example. 4.8	Find 5 geometric means between 576 and 9
Ex 4.2(1)(i)	Find five arithmetic means between 1 and 19
Ex 4.2(1)(ii)	Find six arithmetic means between 3 and 17

5 Mark Questions

Ex 4.1(5)	Find the n th partial sum of the series $$\sum_{n=1}^{\infty}\frac{1}{3^n}$$
Ex 4.1(7)	Find the sum of 101th terms to 200th term of the series $$\sum_{n=1}^{\infty}\frac{1}{2^n}$$
Example.4.10	If a, b are two different positive numbers then prove that (i)A.M.,G.M.,H.M., are in G.P (ii) A.M>G.M.>H.M
Ex 4.2 (5)	If a, b, c are in H.P., Prove that $\frac{b+a}{b-a}+\frac{b+c}{b-c}=2$
Ex 4.2 (9)	If the p^{th} and q^{th} terms of a H.P are p and q respectively, show that $(pq)^{th}$ term is 1
Ex 4.3 (5)	Find the 5th term in the expansion of $(1-2x^3)^{\frac{11}{2}}$

5.Analytical Geometry (Up to Ex. 5.4)

2 Mark Questions

Example 5.2	Find the locus of the point which is equidistant from $(-1,1)$ and $(4,-2)$
Example.5.4	Find a point on x -axis which is equidistant from the point $(7,-6)$ and $(3,4)$
Ex 5.1 (1)	A point moves so that it is always at a distance of 6 units from the point $(1,-4)$. Find its locus.
Ex 5.1 (2)	Find the equation of the locus of the point which are equidistant from$(1,4)$ and $(-2,3)$
Example.5.7	Determine the equation of the straight line passing through the points $(1,2)$ and $(3,-4)$
Example 5.9	Find the length of the perpendicular from $(2,-3)$ to the line $2x-y+9=0$.
Ex 5.2 (4)	Find the equation of the straight line joining the points $(3,6)$ and $(2,-5)$
Ex 5.2 (12)	Find the intercepts made by the line $7x+3y-6=0$ on the co-ordinate axis
Example 5.14	Show that the straight lines $2x+y-9=0$ and $2x+y-10=0$ are parallel
Example.5.16	Find the distance between the parallel lines and $2x+3y-6=0$ and $2x+3y+7=0$
Example 5.17	Show that the straight lines $2x+3y-9=0$ and $3x-2y+10=0$are at right angles
Example.5.19	Find the equation of the straight line perpendicular to the straight line $3x+4y+28=0$ and passing through the point $(-1,4)$
Ex 5.3 (1)	Find the angle between the straight lines $2x+y=4$ and $x+3y=5$
Ex 5.3 (2)	Show that the straight lines $2x+y=5$ and $x-2y=4$ are at right angles
Ex 5.4 (1)	If the equation $ax^2+3xy-2y^2-5x+5y+c=0$ represents a pair of perpendicular straight lines, find a and c
Ex 5.4 (2)	Find the angle between the pair of straight lines given by $(a^2-3b^2)x^2+8abxy+(b^2-3a^2)y^2=0$

3 Mark Questions

Ex 5.1 (3)	If the point $P(5t-4,t+1)$ lies on the line $7x-4y+1=0$, find (i)the value of t (ii) the co-ordinates of P
Ex 5.1 (7)	A,B are two points $(1,0)$ and $(-2,3)$. Find the equation of the locus of a point such that (i) $PA^2+PB^2=10$ (ii) $PA=4PB$
Example.5.11	Find the equation of the straight line, if the perpendicular from the origin makes an angle of 120^0 with x-axis and the length of the perpendicular from the origin is 6 units.
Ex 5.2 (14)	Find the distance of the line $4x-y=0$ from the point $(4,1)$ measured along the straight line making an angle of 135^0 with the positive direction of the x -axis
Example.5.13	Find the angle between the straight lines $3x-2y+9=0$ and $2x+y-9=0$
Ex . 5.3 (8)	Find the values of p for which the straight lines $8px+(2-3p)y+1=0$ and $px+8y-7=0$ and are perpendicular to each other.
Ex 5.3 (20)	If $ax+by+c=0, bx+cy+a=0$and $cx+ay+b=0$ are concurrent, show that $a^3+b^3+c^3=3abc$
Example.5.29	The slope of one of the straight lines of $ax^2+2hxy+by^2=0$ is thrice that of the other, show that $3h^2=4ab$

Example.5.33	Find the combined equation of the straight lines whose separate equations are $x+2y-3=0$ and $3x-y+4=0$
Ex 5.4 (3)	Show that if one of the angles between pair of straight lines $ax^2+2hxy+by^2=0$ is 60^0 then $(a+3b)(3a+b)=4h^2$
Ex 5.4 (5)	The slope of one of the straight lines $ax^2+2hxy+by^2=0$ is twice that of the other, show that $8h^2=9ab$

5 Mark Questions

Ex 5.2 (10)	Find the equation of the diagonals of a quadrilateral whose vertices are $(1,2),(-2,-1),(3,6)$ and $(6,8)$
Example 5.20	Show that the triangle formed by straight lines $4x-3y-18=0, 3x-4y+16=0$ and $x+y-2=0$ is isosceles
Example 5.24	Find the equation of the straight line which passes through the intersection of the straight lines $5x-6y=1$ and $3x+2y+5=0$ and is perpendicular to the straight line $3x-5y+11=0$
Example 5.25	Show that the straight lines $3x+4y=13, 2x-7y+1=0$ and $5x-y=14$ are concurrent.
Example 5.26	Find the co-ordinates of orthocenter of the triangle formed by the straight lines $x-y-5=0, 2x-y-8=0$ and $3x-y-9=0$
Example 5.27	For what values of 'a' the three straight lines $3x+y+2=0, 2x-y+3=0$ and $x+ay-3=0$ are concurrent?
Ex 5.3 (13)	Show that the angle between $3x+2y=0$ and $4x-y=0$ is equal to the angle between $2x+y=0$ and $9x+32y=41$
Ex 5.3 (14)	Show that the triangle whose sides are $y=2x+7, x-3y-6=0$ and $x+2y=8$ is right angled. Find its other angles.
Ex 5.3 (15)	Show that the straight lines $3x+y+4=0, 3x+4y-15=0$ and $24x-7y-3=0$ form an isosceles triangle.
Ex 5.3 (16)	Show that the straight lines $3x+4y=13, 2x-7y+1=0$ and $5x-y=14$ are concurrent.
Ex 5.3 (17)	Find 'a' so that the straight lines $x-6y+a=0, 2x+3y+4=0$ and $x+4y+1=0$ may be concurrent
Ex 5.3 (19)	Find the co-ordinates of the orthocenter of the triangle whose vertices are the points $(-2,-1),(6,-1)$ and $(2,5)$
Ex 5.3 (21)	Find the co-ordinates of the orthocenter of the triangle formed by the straight lines $x+y-1=0, x+2y-4=0$ and $x+3y-9=0$
Ex 5.3 (22)	The equation of the sides of a triangle are $x+2y=0, 4x+3y=5$ and $3x+y=0$. Find the co-ordinates of the orthocenter of the triangle.
Example 5.31	Show that the equation $3x^2+7xy+2y^2+5x+5y+2=0$ represents a pair of straight lines and also find the separate equation of the straight lines.
Ex 5.4 (8)	Find k such that the equation $12x^2+7xy-12y^2-x+7y+k=0$ represents a pair of straight lines. Find the separate equations of the straight lines and also the angle between them.
Ex 5.4 (11)	Show that $3x^2+10xy+8y^2+14x+22y+15=0$ represents a pair of straight lines and the angle between them is $\tan^{-1}\left(\frac{2}{11}\right)$