19. (a) Prove that the equation
$12x^2 + 7xy - 10y^2 + 13x + 45y - 35 = 0$
represents a pair of two straight lines and find the angle between them.

(b) Calculate the arithmetic mean, median of the frequency distribution given below.

x :	0-10	10-20	20-30	30-40
f :	5	8	3	4

9198/A11 **OCTOBER 2010**

MATHEMATICS

Time : Three hours Maximum : 100 marks

PART A — ($6 \times 5 = 30$ marks)

Answer any SIX questions.

1. Evaluate $\underset{x \to 1}{Lt} \dfrac{\sqrt{1+x} - 1}{x}$.

2. Find $\dfrac{dy}{dx}$, when $x^3 + 3a\,xy + y^3 = a^3$.

3. Evaluate $\int \dfrac{dx}{\sqrt{2x^2 + 3x + 4}}$.

4. Evaluate $\int \dfrac{dx}{4 + 5\sin x}$.

5. Prove that the diagonals of a parallelogram bisect each other.

6. Find the inverse of the matrix.

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}.$$

7. Prove that $x^2 + 9y^2 + 6xy + 4x + 12y - 5 = 0$ represents two parallel straight lines.

8. Find the equation of the circle which pases through the points (3, 4), (3, 6), (–1, 2).

9. Calculate the Arithmetic mean from the following frequency table :

x :	50	48	46	44	42	40
y :	12	14	16	13	11	9

10. Obtain the standard deviation of the following data :

x :	2.0	2.5	3.0	3.5	4.0	4.5	5.0
y :	5	38	65	92	70	40	10

PART B — ($4 \times 10 = 40$ marks)

Answer any FOUR questions.

11. Find the n^{th} derivative of y, when $y = \dfrac{x^2}{(x-1)^2 (x+2)}$.

12. Prove that $\displaystyle\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx = \frac{1}{\sqrt{2}} \log\left(\sqrt{2} + 1\right)$.

13. Solve the system of equations ;

$x + 2y + 3z = 1$

$2x + 3y + 2z = 2$

$3x + 3y + 4z = 1$

by matrix method.

14. Solve $(x^2 - y^2)dx + 2xydy = 0$.

15. Solve $\sqrt{p} + \sqrt{q} = 2x$.

16. Obtain the correlation coefficient from the following :

x :	65	66	67	67	68	69	70	72
y :	67	68	65	68	72	72	69	71

PART C — ($2 \times 15 = 30$ marks)

Answer any TWO questions.

17. (a) Find the n^{th} differential coefficient of $x^2 \log x$.

(b) Obtain the equation to the tangent to $y = f(x)$ at (x_1, y_1).

18. (a) Evaluate $\displaystyle\int_0^{\pi/2} \log \sin x \, dx$.

(b) Prove that

$\vec{i} \times (\vec{a} \times \vec{i}) + \vec{j} \times (\vec{a} \times \vec{j}) + \vec{k} \times (\vec{a} \times \vec{k}) = 2\vec{a}$.

9199/A12 **OCTOBER 2010**

PROGRAMMING IN C

Time : Three hours Maximum : 100 marks

PART A — (6 × 5 = 30 marks)

Answer any SIX questions.

1. Explain how a character is read and write with an example.

2. Explain the rules for using "scanf" statement.

3. What are the steps involved in writing a function?

4. Explain the concept of function reference.

5. Explain how a array is declared with suitable example.

6. Explain the rules for pointer operations.

7. Explain how the structure is initialized, give an example.

8. How does a union differ from structure?

9. Explain the two different categories of data files.