PART-A

1. The joint pdf of random variable x and y is given by $\mathbf{f(x,y)=kxye^{-(x^2+y^2)}, x>0, y>0}$ find the value of k.

2. If X and Y have joint pdf $\mathbf{f(x,y)=\begin{cases} x+y, 0<x<1, 0<y<1 \\ 0, \quad otherwise \end{cases}}$. check whether X and Y are independent.

3. Let X and Y have j.d.f f(x,y)=2, 0<x<y<1. Find m.d.f y

4. The j.d.f of the random variables X and Y is given by
$\mathbf{f(x,y)=\begin{cases} 8xy, 0<x<1, 0<y<x \\ 0, \quad otherwise \end{cases}}$ $\mathbf{.find f_x(x).}$

5. Given $\mathbf{f(x,y)=\begin{cases} cx(x-y), 0<x<2, -x<y<x \\ 0, \quad otherwise \end{cases}}$, find c.

6. The joint p.d.f of a bivariate random variable (X,Y) is given by
$\mathbf{f(x,y)=\begin{cases} kxy, 0<x<1, 0<y<1 \\ 0, \quad otherwise \end{cases}}$, find K

7.If the joint pdf of (x,y) is $\mathbf{f(x,y)=\frac{1}{4}, 0<x,y<1}$, find $\mathbf{p(x+y\le 1).}$

8. Two random variables X and Y have joint pdf $\mathbf{f(x,y)=\begin{cases} \frac{xy}{96}, 0<x<4, 1<y<5 \\ 0, \quad otherwise \end{cases}}$, find E(x).

9.If the joint pdf of (x,y) is given by $f(x,y)=x+y, 0\le x,y\le 1$ $E(XY)$. Find .

10..Find the acute angle between the two lines of regression

11.State the equation of the two regression lines. What is the formula for correlation coefficient

12.If X and Y are independent random variables with variance 2 and 3. Find the variance of 3X+4Y.

13.The two lines of regression are $8x-10y+66=0$, $40x-18y-214=0$.

Find the mean value of X and Y.

14.The two regression lines are $x=\frac{9}{20}y+\frac{107}{20}$, $y=\frac{4}{5}x+\frac{33}{5}$. Find correlation coefficient?

PART B

1. From the following distribution of (X,Y) find.

(i) $P(X\le 1)$ (ii) $P(Y\le 3)$ (iii) $P(X\le 1, Y\le 3)$ (iv) $P\left(X\le\frac{1}{Y}\le 3\right)$ (v) $P\left(Y\le\frac{3}{X}\le 1\right)$ (vi) $P(X+Y\le 4).$

X \ Y	1	2	3	4	5	6
0	0	0	$\frac{1}{32}$	$\frac{2}{32}$	$\frac{2}{32}$	$\frac{3}{32}$
1	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
2	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{64}$	$\frac{1}{64}$	0	$\frac{2}{64}$

2. If the joint p.d.f of a two dimensional random variable (X,Y) is given by

$$f(x,y)=\begin{cases}x^2+\frac{xy}{3}: & 0<x<1; 0<y<2\\ 0: & otherwise\end{cases}$$

Find (i) $P(X>{}^1/_2)$ (ii) $P(Y>1)$ (iii) $P(Y<X)$ (i) $P\left(Y<{}^1/_2 \,\middle/\, X<{}^1/_2\right)$ (v) $P(X+Y\ge 1)$

(vi) find the conditional density functions.

(vii) Check whether the conditional density functions are valid.

3. The joint p.d.f of the random variable (X,Y) is given by

$$f(x,y) = kxye^{-(x^2+y^2)} \quad x > 0, y > 0$$

(i)Find k (ii) Prove that X and Y are independent.

4. Two random variables X and Y have the following joint probability density functions

$$f(x,y) = \begin{cases} 2-x-y : 0 \le x \le 1, 0 \le y \le 1 \\ 0 \quad\quad\quad\quad\quad\quad\quad\quad : otherwise \end{cases}$$

(i)Find the marginal density functions of X and Y

(ii) Conditional density function

(iii) Var X and Var Y

(iv) Correlation coefficient between X and Y.

5. Marks obtained by 10 students in Mathematics(x) and statistics(y) are given below

x:	60	34	40	50	45	40	22	43	42	64
y:	75	32	33	40	45	33	12	30	34	51

Find the two regression lines. Also find y when x=55.

6. In a correlation analysis the equations of the two regression lines are $3x + 12y = 9; and\ 3y + 9x = 46$. Find (i) The value of the correlation coefficient (ii) Mean value of X and Y.

7. From the following data

(i) two regression eqn (ii) correlation co.eff

(ii) the most likely mark in Statistics when marks in Economics are 30

Economics	25	28	35	32	31	36	29	38	34	32
Statistics	43	46	49	41	36	32	31	30	33	34

PART C

1. Discuss briefly about the applications of Two Dimensional random variable,correlation,Regression.