



DIGITAL ASSIGNMENT – I

1. Find the missing frequency for the following distribution if the mean is 12.9

Class Interval	0-5	5-10	10-15	15-20	20-25
Frequency	3	F	8	5	4

2. An analysis of monthly wages of workers of two factories A and B yielded the following results:

	Factories	
	A	B
No.of workers	50	60
Average monthly wages	Rs.60	Rs.48

Obtain the average monthly wages of all workers taken together.

3. Calculate the combined A.M of the following data:

	Class A	Class B
No.of students	150	250
Average marks	72	73

4. An analysis of the monthly wages paid to workers in two firms A and B belonging to the same industry, gives the following result:

	Firm A	Firm B
Number of wage earners	550	650
Average monthly wages	Rs. 1450	Rs.1400
Variance of the distribution of wages	Rs.10000	Rs.19600

(A) Which firm, A or B pays out larger amount as weekly wages?

(B) In which firm, A or B is there greater variability in individual wages?

(C) Find the average weekly wages and standard deviation of individual wages of all

workers in the two firms taken together.

5. The average rainfall of a city from Monday to Saturday is 0.3 inch. Due to heavy rainfall on Sunday, the average rainfall for the week increased to 0.5 inch. Find out the rainfall on Sunday.

6. The mean marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean corresponding to the correct score.

7. The first four moments of a distribution about the value 4 of variable are -1, 1.5, 17, -30 and 108. Find the central moments β_1 and β_2

8. A R.V X has the following probability function:

X;	0	1	2	3	4	5	6	7
P(X):	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

(i) Find K

(ii) Evaluate $P(X < 6)$

(iii) If $P(X \leq C) > \frac{1}{2}$ find the minimum value of C.

(iv) Evaluate $P(1.5 < X < 4.5 / X > 2)$

(v) Find $P(X < 2)$, $P(X > 3)$, $P(1 < X < 5)$

9. If the density function of a continuous random variable X is given by

$$f(x) = \begin{cases} ax, & 0 \leq x \leq 1 \\ a, & 1 \leq x \leq 2 \\ 3a - ax, & 2 \leq x \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

(i) Find the value of a.

(ii) The cumulative distribution functions of X.

10. The distribution function of a r.v X is given by

$F(x) = 1 - (1+x)e^{-x}, x \geq 0$. Find the density function, mean and variance of X.

11. The joint density function of the RVs X and Y is given by,

$$f(x,y) = \begin{cases} 8xy, & 0 < x < 1: 0 < y < x \\ 0, & \text{otherwise} \end{cases}$$

Find $P\left(Y < \frac{1}{8} / X < \frac{1}{2}\right)$. Also find the conditional density function $f\left(\frac{x}{y}\right)$

12. If the joint density function of the two RVs X and Y be $f(x,y) = \begin{cases} e^{-(x+y)}, & x \geq 0, y \geq 0 \\ 0, & \text{otherwise} \end{cases}$

Find (i) $P(X < 1)$ and (ii) $P(X+Y < 1)$

13. Given the joint pdf of (X,Y) as $f(x,y) = \begin{cases} 8xy, & 0 < x < y < 1 \\ 0, & \text{otherwise} \end{cases}$ Find the marginal and conditional pdfs of X and Y. Are X and Y are independent?

14. If the moment generating function of X is $M_X(t) = \frac{2}{5}e^t + \frac{1}{5}e^{2t} + \frac{2}{5}e^{3t}$, then find the mean and variance of X?

15. The cumulative distribution function (cdf) of a random variable X is given by

$$F(x) = \begin{cases} 0 & x < 0 \\ x^2 & 0 \leq x < \frac{1}{2} \\ 1 - \frac{3}{25}(3-x)^2, & \frac{1}{2} \leq x < 3 \\ 1 & , x \geq 3 \end{cases} . \text{ Verify it is a proper cdf and find the pdf of X}$$

and evaluate $P(|X| \leq 1)$ Using both the pdf and cdf.

16. If X and Y are random variables having density function $f(x,y) = \frac{1}{8}(6-x-y)$,

$0 < x < 2, 2 < y < 4$, Find $P(X + Y < 3)$.

17. The following table gives the joint probability distribution of X and Y. Find (i) marginal density function of X. (ii) marginal density function of Y.

Y \ X	1	2	3
1	0.1	0.1	0.2
2	0.2	0.3	0.1

18. If the joint pdf of (X,Y) is $f(x,y) = \begin{cases} \frac{1}{4}, & 0 \leq x < 2 \\ 0, & \text{otherwise} \end{cases}$.

Find $P(x+y \leq 1)$ if $P(y=1) = 0.4$ and $P(Y = 2) = 0.6$

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

20. Find the marginal density functions of X and Y if

$$f(x,y) = \begin{cases} \frac{1}{4}(2x+5), 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0, \text{otherwise} \end{cases}.$$

21. Find the marginal density functions of X and Y from the joint density function

$$f(x,y) = \begin{cases} \frac{2}{5}(2x+3y), 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0, \text{otherwise} \end{cases}.$$

22. X and Y are two random variables having the joint density function

$$f(x,y) = \frac{1}{27}(x+2y), \text{ where } x \text{ and } y \text{ assumes the integer values } 0, 1 \text{ and } 2. \text{ Find the marginal probability distribution of X.}$$

23. Find the value of k if $f(x,y) = k(1-x)(1-y)$ for $0 < x, y < 1$ is to be a joint density function.

24. Find k if the joint probability density function of a bivariate random variable (X,Y) is given by $f(x,y) = k(1-x)(1-y)$ if $0 < x < 4, 1 < y < 5$ and 0 otherwise.

25. Find the marginal density functions of X and Y from the joint density function

$$f(x,y) = \begin{cases} \frac{2}{5}(2x+3y), 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0, \text{otherwise} \end{cases}$$

26. Find E(x) if joint pmf is given by

y \ x	x	
	-1	1
0	1/8	3/8
1	2/8	2/8

27. Find k, if probability density function $f(x) = k(2x-x^2), 0 < x < 2$.

28. Find Marginal p.m.f. of X & Y for the following data.

x \ y	1	2	3
	1	2	3
1	0.1	0.1	0.2
2	0.2	0.3	0.1

29. Is the function defined as follows a proper probability density function?

$$f(x) = \begin{cases} \frac{1}{18}(3+2x) & \text{for } 2 \leq x \leq 4 \\ 0 & , \text{otherwise} \end{cases}$$

30. Given the joint distribution of X and Y.

Y/X	0	1	2
0	0.02	0.08	0.10
1	0.05	0.20	0.25
2	0.03	0.12	0.15

Obtain (i) marginal distribution and (ii) the conditional distribution of X given Y = 0

(iii) $P(y \leq 2)$, (iv) $P(x \leq 1/y \leq 2)$,

31. Given the joint density function $f(x,y) = cx(x-y)$, $0 < x < 2$, $-x < y < x$, Evaluate c . Find the marginal densities of X and Y. Find the conditional density of Y given $X = x$.

32. The joint pdf of two random variables X and Y is given by

$$f(x,y) = \frac{9(1+x+y)}{2(1+x)^4(1+y)^4}, 0 \leq x \leq \infty, 0 \leq y \leq \infty. \text{ Find the marginal distribution of X and}$$

Y and the conditional distribution of Y for $X = x$.

$$33. X \text{ is a continuous random variable with pdf given by } f(x) = \begin{cases} kx, 0 \leq x \leq 2 \\ 2k, 2 \leq x \leq 4 \\ 6k - kx, 4 \leq x \leq 6 \\ 0, \text{elsewhere} \end{cases}$$

Find the value of k and also the cdf

34. If the joint pdf of a random variable (X,Y) is given by

$$f(x,y) = x^2 + \frac{xy}{3}, 0 \leq x \leq 1, 0 \leq y \leq 2, \text{ find the conditional densities of X given Y and Y}$$

given X.