



# ADITYA DEGREE COLLEGES

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II SEMESTER – MID – I - EXAMINATIONS

Date:

Subject : Random variable & Mathematical  
Expectations –(Stat Major)

Max. Marks : 60

Time : 2 Hrs

## SECTION – A

I. Answer any FIVE the questions:

5 x 4 = 20 M

1. Define random variable and types of Random variable.
2. Define P.M.F and p.d.f
3. A random variable  $x$  has the following probability function.

$x$	-2	-1	0	1	2	3
$P(x=x)$	0.1	K	0.2	2k	0.3	k

Find i) k

ii) mean and variance

4. If the probability function  $f(x)=6x(1-x)$ ,  $0 \leq x \leq 1$  determine a number  $b$  if

$$p(x < b) = p(x > b)$$

5. Define joint probability mass function and marginal probability mass function.
6. The joint probability distribution of  $x$  and  $y$  is given below

$y/x$	1	2	3
1	0.1	0.1	0.2
2	0.2	0.3	0.1

Find i) marginal distributions, ii)  $P(x>1)$  iii) conditional distribution of,  $Y/X=2$

7. The joint probability density function of  $x$  and  $y$  is given by  $f(x,y)$ ,  $e^{-(x+y)}$ ,  $x \geq 0, y \geq 0$

Check that  $x$  and  $y$  are independent random variables.

8. Define two dimensional random variable.

## SECTION – B

II. Answer all the questions:

4 X 10 = 40 M

9. a) Define probability distribution function and write its properties with proofs.

or

b) Calculate coefficient of Skewness and Kurtosis to the following data

x	-2	-1	0	1	2
P(x)	0.1	0.2	0.4	0.2	0.1

10. a) If x is a continuous random variable with pdf  $f(x) = y_0 x(2-x)$ ,  $0 \leq x \leq 2$  find

i) mean ii) variance iii) median

Or

b) Calculate moments about mean for the following data

x	-2	-1	0	1	2	3
P(x)	0.2	0.2	0.3	0.1	0.1	0.1

11. a) Define joint p.d.f marginal p.d.f and conditional p.d.f

Or

b) The joint probability density function of x & y is

$$f(x, y) = \frac{1}{8}(6-x-y), \quad \begin{matrix} 0 < x < 2 \\ 2 < y < 4 \end{matrix}$$

Find i)  $p(x < 1 / y < 3)$  ii)  $p(x+y < 3)$  iii)  $p(x < 1 \cap y < 3)$

12. a) Define joint probability distribution function marginal and conditional probability distribution function.

Or

b) Explain the properties of joint probability distribution function.

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