

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)

**BSc DEGREE EXAMINATION DECEMBER 2018**  
(Third Semester)

Branch - **MATHEMATICS**

**MATHEMATICAL STATISTICS-I**

Time : Three Hours

Maximum : 75 Marks

**SECTION-A (20 Marks)**

Answer **ALL** questions

**ALL questions carry EQUAL marks (10 x 2 = 20)**

- 1 Define Independent Events.
- 2 From a pack of 52 cards, one card is drawn at random. Find the probability of getting a queen .
- 3 Define Distribution Function.
- 4 Define Discrete random variable.
- 5 Define Moment Generating Function.
- 6 Write the Multiplication theorem of Expectation.
- 7 Define Normal distribution.
- 8 Find the Binomial distribution for which the mean is '4' and variance is 3.
- 9 Define chi-square (x ) distribution.
- 10 What is linear correlation?

**SECTION - B (25 Marks)**

Answer **ALL** Questions

**ALL Questions Carry EQUAL Marks (5 x 5 = 25)**

- 11 a Write a short note on conditional probability .  
OR  
b A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour.
- 12 a A random variable 'X' has the following probability function:

X:	0	1	2	3	4	5	6	7	8
P(x):	a	3a	5a	7a	9a	11a	13a	15a	17a

- i) Determine the value of a.
- ii) Find  $P(X < 3)$ ,  $P(x > 3)$ ,  $P(0 < x < 5)$ .  
OR  
b A continuous random variable 'X' has the p.d.f:  $f(x) = 6x(1-x), 0 < X < 1$ .  
i) Check that  $f(x)$  is a p.d.f and  
ii) Determine a number such that  $P(x < b) = P(x > b)$
- 13 a Prove that  $V(x) = E [V(x)] + V[E(x)]$  .  
OR  
b Explain the marginal distribution function.
- 14 a Derive the Additive property of Binomial distribution .  
OR  
b Obtain the M.G.F of poisson distribution.
- 15 a Explain F-distribution and state its applications.  
OR  
b Write down the four conditions for application of chi.squre test.

**SECTION - C (30 Marks)**Answer any **THREE** Questions**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 State and prove Baye's theorem.

17 Let 'X' be a continuous random variable

$$f(x) = \begin{cases} ax & 0 < x < 1 \\ a & 1 < x < 2 \\ -ax + 3a & 2 < x < 3 \\ 0 & \text{elsewhere} \end{cases}$$

(i) Determine the Constant 'a'.

(ii) Compute  $P(x < 1.5)$ .

18 Two r.y X &amp; Y borne the following j.p.d function

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

Find i) Marginal probability density functions of X&amp;Y.

ii) Conditional density function.

iii)  $V(X)$  of  $V(Y)$  andiv)  $\text{cov}(X,Y)$ .

19 Explain the chief characteristics of Normal Distribution.

20 Obtain the equations of two lines of regression for the following data. Also obtain the estimate of X for  $Y = 70$ .

X:	65	66	67	67	68	69	70	72
Y:	67	68	65	68	72	72	69	71

z-z-z

END

/