PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 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 sample space.

2   Define conditional probability.

3   Define continuous random variable.

4   Define distribution function.

5   Define mgf.

6   Define covariance.

7   Define Poisson distribution.

8   Define normal distribution.

9   Define f-distribution.

10   Define correlation.

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a   State and prove addition theorem for two events.

OR

  b   A bag contains 8 red, 5 green and 6 white balls. Three balls are drawn at random. What is the probability that a red, a white and a green ball are drawn?

12 a   Write down the properties of distribution function.

OR

  b   Let X be a random variable with the following probability distribution

       x :   -3   6   9
       P(x) :   1/6   ½   1/3

    Find $E(x)$ and $E(x^2)$.

13 a   Show that the mgf of the sum of a no. of independent r.v's is equal to the product of their respective mgf.

OR

  b   The joint pat of two random variable $x \in y$ is $f(x, y) = 4-x-y$; $0 < x < z$, $0 < y < 2$ Find marginal pdf of $x \in y$.

14 a   Four coins are tossed simultaneously. What is the probability of getting (i) 2 heads (ii) at least two heads.

OR

  b   Derive mean of normal distribution.

15 a   What are the properties of chi-square distribution?

  OR

  b   Calculate Karl Pearson coefficient of correlation

X :	2	4	6	8	10
Y :	20	18	16	14	12

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

16   Two friends appear in an interview for two vacancies in the same post. The probability of first one is selected is ¼ and second one is selected is 1/5. What is the probability that (i) Both of them will be selected (ii) Only one of them will be selected.

17   The probability density function is given by

$$f(x) = Ax \qquad 0 \le x \le 5$$
$$= A(10-x) \quad 5 \le x \le 10$$
$$= 0 \qquad \text{otherwise}$$

i) Find the value of k   and (ii) Find p $(5 \le x \le 10)$.

18   The joint probability density function of two random variable $x \in y$ is $f(x, y) = A(6-x-y)$ $0 < x < 2$; $2 < y < 4$ (i) Find the value of A (ii) Obtain the marginal density fn. of $x \in y$.

19   Prove that $\mu_{r+1} = \lambda r \mu_{r-1} + \lambda \dfrac{d\mu r}{d\lambda}$.

20   Obtain the two regression equations

X :	1	2	3	4	5	6	7
Y :	9	8	10	12	11	13	14

Z-Z-Z   END