UNIVERSITY OF NORTH BENGAL

B.Sc. Programme 2nd Semester Examination, 2021

DSC2-STATISTICS

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

GROUP-A

1.   Answer any *four* questions from the following: 2×4 = 8

   (a) State two properties of binomial distribution.

   (b) Show that the probability of an impossible event is zero.

   (c) For any random variable *X*, show that $\operatorname{Var}(a - bX) = b^2 \operatorname{Var}(X)$.

   (d) A coin is tossed 6 times in succession. Find the probability of obtaining one head.

   (e) State two properties of Hyper-geometric distribution.

   (f) Give the classical definition of probability.

GROUP-B

Answer any *four* questions from the following   8×4 = 32

2. (a) Find the variance of Poisson distribution.   4

   (b) Show that the expectation of the sum of two jointly distributed random variables   4
   X and *Y* is the sum of their expectations.

3. (a) Explain discrete probability distribution.   3

   (b) The joint p.d.f. of (*X*, *Y*) is given by   5

$$f(x, y) = 2 \quad ; \quad 0 < x < 1 \text{ and } 0 < y < x$$
$$= 0 \quad ; \quad \text{otherwise}$$

   Find the marginal density of *X* and the conditional density of *Y* (given *X* = *x*).

4.   State and prove Chebyshev's inequality for a continuous random variable.   2+6=8

5. (a) Write down the probability density function of normal distribution.   1

   (b) What is the chance that a leap year selected at random will contain 53 Sunday?   2

   (c) Write down the chief characteristics of normal probability curve.   5

6. (a) State the Bayes' theorem.   1

   (b) If X is a Poisson variate such that $P(X=2)=9P(X=4)+90P(X=6)$. Find the mean of X.   3

   (c) A coin is tossed until a head appear. What is the expectation of the number of tosses required?   4

7. (a) Define: 1+1

    (i) Mutually exclusive events.

    (ii) Equally likely events.

   (b) Two cards are drawn from a full pack of 52 cards. Find the probability that (i) both are red cards, (ii) one is a diamond and the other is a heart.   6

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