UNIVERSITY OF NORTH BENGAL

B.Sc. General Part-II Examination, 2021

STATISTICS

PAPER-IV (OLD SYLLABUS)

PROBABILITY AND NUMERICAL ANALYSIS

Full Marks: 50

ASSIGNMENT

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

GROUP-A

Answer *all* the questions from the following   1×10= 10

1. What is random variable?

2. What do you mean by 'mutually exclusive' events?

3. What is Bernoulli trial?

4. Show that probability of an event lies between 0 and 1.

5. Distinguish between probability mass function and probability density function.

6. A coin tossed three times in succession. Find the probability of obtaining one tail.

7. $P(A \cup B) = \dfrac{5}{6}$, $P(A \cap B) = \dfrac{1}{3}$ and $P(A^C) = \dfrac{1}{2}$, then show that, A and B are independent.

8. Define relative error.

9. What do you mean by interpolating polynomial?

10. What do you mean by cumulative distribution function?

GROUP-B

Answer *all* the questions from the following   6×4 = 24

11. A random variable *X* is defined as follows.   6

$$P(X = 1) = p, \ P(X = 0) = 1 - p \quad \text{where } 0 < p < 1$$

Find the mean, variance and the central moments m_2, m_3 and m_4 of the distribution.

12. For what value of k, $f(x, y)$ represents the joint probability density function of two continuous random variables X and Y where,   6

$$f(x\ y) = k(4 - 2x + y); 0 \leq x \leq 3, 2 \leq y \leq 4$$
$$= 0, \text{ otherwise}$$

Also find $P(X \leq 2 | Y \leq 3)$.

13. Derive the expression of mean and variance of Binomial distribution.   6

14. Derive the expression of Newton's Forward interpolation formula.   6

GROUP-C

Answer *all* the questions from the following $8 \times 2 = 16$

15.(a) Find the variance of Poisson distribution.   4+4

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

16. Deduce Lagrange's interpolation formula.   8

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