Sylhet Cadet College

Pre-Test Examination - 2022
Class: XII
Set - B
Subject: Statistics 2nd Paper (Creative)

Time: 2 hour & 35 minutes **Subject Code: 130** **Full Marks: 50**

Answer FIVE questions taking at least two (2) from each group. Figures in the right indicate full marks.

Group A

1. **Sadman has an urn with 5 red and 4 white balls. He has randomly drawn two balls from the urn.**

   (a) What is the probability of an uncertain event? 1
   (b) Write the third axiom of probability. 2
   (c) What is the probability that both the balls drawn by Sadman are white? 3
   (d) Are the probabilities of both balls being same color and different color equal? Analyze. 4

2. $P(A) = \frac{3}{10}, P(B) = \frac{2}{5}, P(B \cup A) = \frac{1}{2}$

   (a) What is an independent event? 1
   (b) What is the relationship between independency and mutual excluvity? 2
   (c) Find $P(A|B)$ and $P(B|A)$ 3
   (d) Verify the equality mathematically & empirically: $P(B) = P(A) \cdot P(B|A) + P(\bar{A}) \cdot P(B|\bar{A})$ 4

3. **The probability density function of a continuous random variable is**
   $f(x) = kx^2 + kx + \frac{1}{8}; 0 \leq x \leq 2$

   (a) What is a continuous random variable? 1
   (b) Find the value of k 2
   (c) Find the probability that the values of x would lie between 1 and 3. 3
   (d) Find $P(1 \leq X \leq 3)$ 4

4. **The joint probability function of two random variables X & Y is given below:**
   $P(x, y) = \frac{1}{21}(x + y); x = 1, 2, 3 \ \& \ y = 1, 2$

   (a) What is a probability density function (pdf)? 1
   (b) What is P(X=a) in a pdf, where a is an aribitrary number? 2
   (c) Find the marginal probabilities. 3
   (d) Find $P(x|y), P(x|1)$ and $P(y|4)$ 4

Group B

5. **Sakib has recently graduated from the University of Dhaka. he applies to two firms - EduCube & Digic- for a Data Analyst job. The probability of hiring by EduCube is 0.8 and by Digic is 0.4. The probability that none hires is 0.5.**

   (a) What is a sample space? 1
   (b) Explain how to find $P(\bar{A} \cap B)$ using Venn Diagram. 2
   (c) Find the probability of hirng by by Digic but not by EduCube. 3
   (d) Find the probability that no firm will reject him. 4

6. **Two dice are thrown together. The dice are named A and B.**

   (a) What is P(A=7)? 1
   (b) Create the sample space. 2

(c) What is the probability that the outcomes of A & B are different? 3

(d) Determine the probability that the summation of outcome of two dice is a prime number. 4

7. **A magician draws two cards from a pack (i) with replacement and then (ii) without replacement. The cards were well-shuffled before drawing.**

(a) What is the probability of an impossible event? 1

(b) How to determine the probability of a joint event? 2

(c) As per (i), what is the probability that the cards have different color? 3

(d) As per (ii), what is the probability that the cardsare aces of same color? 4

8. **The probability distribution of a discrete random variable X is given below:**

x	-2	-1	0	1	3	4
P(x)	0.1	k	2k	3k	4k	0.2

(a) What is $\Sigma P(x)$? 1

(b) Find the value of k. 2

(c) Find $P(X \geq 0)\&P(X < 1)$ 3

(d) Find the cumulative distribution function, F(X) and F(2) and explain. 4