SYLHET CADET COLLEGE

FIRST TERM-END EXAMINATION - 2024 | Set | A |
CLASS: XII
MULTIPLE CHOICE QUESTIONS **Subject Code:** | 1 | 3 | 0 |
STATISTICS FIRST PAPER
TIME – 20 minutes
FULL MARKS – 25

[N.B. – Answer all the questions. Each question carries ONE mark. Block fully, with a black ball- point pen, the circle of the letter that stands for the correct/best answer in the "Answer sheet" for the Multiple Choice Questions Examination.]

Candidates are asked not to leave any mark or spot on the question paper.

Short Questions

1. $P(\bar{A}) = 1-$ _____.
2. A die is tossed 5 times. What is the probability that 3 comes up 4 times? _____
3. What is the range of probability? _____
4. If card is drawn from a deck of cards, what is the probability that it is not an ace? _____
5. Give an example of a discrete variable. _____
6. Can $F(x)$ be less than $P(x)$? _____
7. Integration is used if we have a _____ random variable.
8. Expectation is equal to _____ .
9. $E(a) =$ _____?
10. Express $E(X^2)$ in terms of $E(X)$ and $V(X)$ _____

Multiple Choice Questions

1. **In how many ways can a team of 2 be formed from 4 people?**
   (a) 4 (b) 6 (c) 8 (d) 12
2. **The probability of two disjoint sets happening together is:**
   (a) 0.5 (b) 0 (c) 1 (d) $0 \leq x < 1$
3. **The third axiom of probability is –**
   (a) $0 \leq P(A) \leq 1$ (b) $P(S) = 1$
   (c) $P(A_1 U A_2 U \cdots U A_n) = \sum_{i=1}^{\infty} P(A_i)$ (d) $P(A) = 1 - P(A)$
4. **Possible value of probability**
   i. -1 ii. 0.5 iii. 0
   Which one is correct?
   (a) i and ii (b) i and iii (c) ii and iii (d) i, ii and iii
5. **There are 3 red, 4 black, and 5 white balls in an urn. If two balls are randomly taken, what is the probability that both are red?**
   (a) $\frac{1}{66}$ (b) $\frac{1}{22}$ (c) $\frac{2}{22}$ (d) $\frac{3}{11}$
   Answer the next two questions based on the following information

X	0	1	2
P(x)	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$

6. **What is F(1)**
   (a) 0.65 (b) 0.75 (c) 0.5 (d) 1
7. $P(X \leq 1 \leq 3) =-$
   (a) 0.75 (b) 0.70 (c) 0.95 (d) 1
8. **How many types of random variables are there?**
   (a) 2 (b) 3 (c) 4 (d) 5
9. **Which of the following is not a discrete random variable?**
   (a) umber of students (b) Weight
   (c) Number of heads in coin toss (d) Population
   Answer the next two questions based on the following information.

x	4	5	6	3	2	1
P(X)	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

10. **The value of $P(3 < X < 5)$ is:**
    (a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) 0
11. $P(x \neq 2) is$:
    (a) $\frac{5}{6}$ (b) 0
    (c) 1 (d) Can't be found from this information
12. **What is the value of $V(5)$?**
    (a) 0 (b) 25 (c) 5 (d) 1

Answer the next THREE questions based on the following information

X	0	1	2
P(x)	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{5}{12}$

13. **What is the value of $E(X)$**
    (a) $\frac{15}{12}$ (b) $\frac{13}{12}$ (c) $\frac{1}{12}$ (d) $\frac{11}{13}$
14. **What is the value of $E(X^2)$**
    (a) $\frac{25}{12}$ (b) $\frac{13}{12}$ (c) $\frac{23}{12}$ (d) $\frac{25}{13}$
15. **What is $V(2X)$?**
    (a) 2.93 (b) 2.91 (c) 1.97 (d) 2.97

An approximate answer to the right problem is worth a good deal more than an exact answer to an approximate problem. – John Tukey.

SYLHET CADET COLLEGE

FIRST TERM-END EXAMINATION - 2024 | Set | D |
CLASS: XII
STATISTICS (CREATIVE) **Subject Code:** | 1 | 3 | 0 |
SECOND PAPER
TIME – 2 hours & 25 minutes
FULL MARKS – 50

[**N.B.** – The figures of the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any **FIVE** questions taking at least two from each group.]

Group–A

1. **It is observed that 50% of mails are spam. A software filters spam mail before reaching the inbox. Its accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%.**

   (a) What is a disjoint event? 1

   (b) For two independent events, what does the Bayes' theorem reduce to? 2

   (c) What is the probability that a mail is tagged as spam? 3

   (d) If a certain mail is tagged as spam, find the probability that it is not a spam mail. 4

2. **A continuos random variable X follows the following probability density function (pdf).**

$$f(x) = 6x(1-x); 0 \leq x \leq 1$$

   (a) Give an example of a continous random variable. 1

   (b) Examine whether the given function is a pdf. 2

   (c) If $P(X > a) = P(X < a)$, find the value of a. 3

   (d) Should $P(0.5 \leq X \leq 1)$ be equal to 0.5? 4

3. **A box contains four blue and 6 green balls. 3 balls are drawn randomly.**

   (a) What is the value of ${}^nC_r$? 1

   (b) Illustrate the difference between permutation and combination with an example. 2

   (c) What is the probability that all balls are green? 3

   (d) What is the probabilith that one ball has a different color? 4

Group–B

4. **The joint probability function of two random variables X and Y is given below:**

$$P(X,Y) = \frac{x+2y}{16}; x = 0,1; y = 0,1,2,3$$

   (a) Write down the formula of conditional proibability. 1

   (b) What is the relationship between marginal and joint probability? 2

   (c) Find P(X). 3

   (d) Find $P(X|Y)$ and $P(X|0)$. 4

5. **The probability distribution of a random X is provided below:**

X	-1	0	1	2	3
P(x)	$\frac{3}{20}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{20}$

   (a) What is the expectation of a constant m? 1

   (b) Find $E(X)$. 2

   (c) Find $E(Y)$, where $Y = \frac{X}{2}$ 3

   (d) Find Variance of (2X+3). 4

6. **An umbrella seller earns a revenue of BDT. 5000 if it rains. If it does not rain, he loses BDT. 1000. The probability that it rains on a given day is 0.04.**

   (a) Write down the formula of Expectation for a continuous random variable. 1

   (b) Can the value of Expectation be zero? 2

   (c) What is the umbrella seller's expected revenue? 3

   (d) What should be the minimum probability of raining for him to achieve revenue greater than zero? 4