Alderamin

MYMENSINGH GIRLS' CADET COLLEGE
TEST EXAMINATION - 2026
CLASS: XII
STATISTICS (CREATIVE)
SECOND PAPER
[According to the Syllabus of 2026]
TIME – 2 hours & 35 minutes
FULL MARKS – 50

Subject Code: | **1** | **3** | 0 |

[**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 questions from each group]

Group - A

1. **Sakiba has a box which contains 5 red marbles and 7 yellow marbles. She drew 3 marbles at random.**

   (a) What is a sample point in probability? 1

   (b) Briefly explain the empirical probability with an example. 2

   (c) What is the probability that all the marbles are yellow? 3

   (d) What is the probability that a marble has a different color? 4

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

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

   (a) What is a probability distribution 1

   (b) Compute the integral of x^2y with respect to y. 2

   (c) Find $P(X|Y)$. 3

   (d) Analyze whether x and y are independent. 4

3. **A professor showed a probability distribution in a class. The distribution is given below. He informed that the value of the arithmetic mean of the distribution is 3.**

x	1	2	3	4	5
p(x)	0.1	a	0.3	b	0.2

   (a) What is the formula of expectation? 1

   (b) What is the variance of a constant? Explain logically. 2

   (c) What are the values of a & b? 3

   (d) Find and explain the variance of the distribution. 4

4. **The scores of 4 students in an IELTS Test are 7.5, 7.0, 8.5, and 6.0. An instructor said, if samples of size 2 are selected from these score without replacement, the sample mean will be an unbiased estimate of the population mean.**

   (a) What is a sample? 1

   (b) What are the disadvantages of a census? 2

   (c) Estimate the population variance from the data. 3

   (d) Evaluate the statement of the instructor. 4

Group - B

5. **In a binomial distribution, the mean and standard deviations are 3 and $\sqrt{\frac{3}{2}}$. An analysis revealed that the distribution is symmetric.**

   (a) How many outcomes are there in a Bernoulli trial? 1

   (b) Explain the relationship between the mean and variance of the binomial distribution. 2

(c) Find the value of $P(X = 2)$. 3

(d) Assess the finding of the analysis. 4

6. **The number of device failures within a certain period in a tech industry follows a Poisson distribution with a standard deviation of 2.5.**

(a) What is e in Poisson distribution? 1

(b) In a Poisson distribution, $P(2) = P(3)$. What is its standard deviation? 2

(c) Find $P(X \geq 3)$. 3

(d) What is the probabiility that there are no more than 2 device failures within the given period? 4

7. **Price and Quantity Data for Rice, Pulse, and Oil in the years 2013 and 2015 are given below.**

Commodity	(2010)		(2011)	
	Price	Quantity	Price	Quantity
A	45	30	50	40
B	105	5	110	8
C	85	2	80	5

Table 1: Price and Quantity Data for Three Commodities

(a) What is an ideal index number? 1

(b) Is index number unit-free? 2

(c) Compute the price index number, considering 2013 as the base year, using simple aggregate method. 3

(d) Sift the time reversal test for the Laspeyres' price index number. 4

8. **The following dataset records the number of women in different age groups and their respective live births as part of a demographic study.**

Age Group	15–19	20–24	25–29	30–34	35–39	40–44	45–49
No. of Women	540	760	530	495	450	505	430
No. of Live Births	109	198	86	90	65	76	60

(a) Write down the formula of GRR. 1

(b) Differentiate between GRR and NRR. 2

(c) Determine the Age Specific Birth Rates (ASFR) for the given age groups. 3

(d) Find the General Fertility Rate (GFR) and explain its significance in relation to ASFR. 4

–AAM–

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Group - A

1. **A dope test correctly identifies a drug user as positive 90% of the time, but incorrectly identifes 20% non-users as users. The probability of drug use is 0.05.**

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

   (b) Express $P(A|B)$ in terms of $P(B|A)$. 2

   (c) Find the probability of testing positive in the test. 3

   (d) If the test shows a user positive, what is the probability that the person is actually a user? 4

2. **The joint probability function of two random variables X and Y is described by:**

$$P(X,Y) = \frac{2x+3y}{45}; \quad x = 0,1,2; \quad y = 0,1,2$$

   (a) Write down the formula for conditional probability. 1

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

   (c) Find $P(X)$. 3

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

3. **A professor showed a probability distribution in a class. The distribution is given below. He informed that the value of the arithmetic mean of the distribution is 3.**

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Table 2: Price and Quantity Data for Three Commodities

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