



Answer the following questions

Question 1 (20 marks)

(A) Given the following frequency table

Class	1.5- 2.5	2.5- 3.5	3.5- 4.5	4.5- 5.5	5.5- 6.5	6.5- 7.5	7.5- 8.5	8.5- 9.5	9.5-10.5
Frequency	3	3	5	5	6	8	4	4	2

Calculate **(i)** the Arithmetic Mean

(ii) the Median.

(iii) the Mode

(10 Marks)

(B) Given the following frequency table

classes	20-30	30-40	40-50	50-60
frequency	50	35	90	55

Find (i) The Harmonic mean.

(ii) The Geometric mean.

(10 Marks)

Question 2 (10 marks)

(A) Let X be a discrete random variable with the probability function

x	0	1	2	3	4
P(x)	1/8	2/8	3/8	1/8	1/8

$P(x) = 0$ Elsewhere,

Graph the probability function.

(5 Marks)

(B) Prove that

(i) $P(\emptyset) = 0$

(ii) If A, B any two events, then $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

(5 Marks)

Question 3 (10 marks)

(A) In the following data calculate the mean deviation

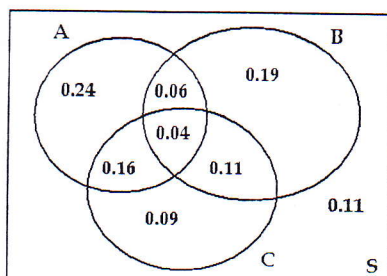
12, 17, 23, 13, 15, 16, 37, 8, 9, 10

(5 Marks)

(B) The probability that at least one of three events A, B, and C will occur is given by

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C)$$

Verify this formula with the probabilities shown in figure.



(5 Marks)

Question 4 (20 marks)

(A) Find algebra A which is defined on a tossing coin twice experiment and discuss its properties.

(5 Marks)

(B) Suppose that an experiment of birth of 3 children

E_1 : is event that the first child is a boy,

E_2 : is event that the second child is a girl,

Are E_1 and E_2 independent events?

(5 Marks)

(C) Find the arithmetic mean, Geometric mean, Harmonic mean, the Mode and the Median for the following data: 8, 27, 14, 8, 12, 15

(10 Marks)

Question 5 (20 marks)

(A) Three coins are tossed, write the sample space S and find the probability that all are heads **if**:

1- First coin is head.

2- At least one of the coins is head.

(10 Marks)

(B) If A, B are two events in a sample space such that $A \subset B$, and

$$P(A \cup B) = \frac{3}{4}, P(A' \cap B) = \frac{5}{8}, \text{ Find probability of:}$$

(i) Non -occurrence of B

(ii) Occurrence of A

(iii) Occurrence of only A

(10 Marks)

Question 6 (20 marks)

(A) A continuous random variable X has a density function

$$\text{given by } f(x) = \begin{cases} k(2-x) & 0 \leq x \leq 2 \\ 0 & \text{elsewhere} \end{cases}$$

(i) Find the constant k .

(ii) Compute $P(1 < X < 2)$

(10 Marks)

(B) For a continuous random variable, let

$$f(x) = \begin{cases} x & 0 \leq x \leq 1 \\ \frac{3-x}{4} & 1 \leq x \leq 3 \\ 0 & \text{elsewhere} \end{cases}$$

Is $f(x)$ a density function? If so find the distribution function $F(x)$.

(10 Marks)

This exam measures the following ILOs

Question Number	Q4-a	Q5-a	Q6-b	Q1-b	Q5-b	Q6-b	Q4-c		Q1-b	Q3-a	Q4-a
Skills	Q2-b				Q2-a	Q3-b			Q3-a		
	Knowledge & understanding skills				Intellectual Skills				Professional Skills		

With my best wishes

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