Menofia University Faculty of Engineering Shebien El-kom (Diploma) Academic Year : 2017-2018 Department : Basic Eng. Sci.		Subject : Probability and Statistics (BES503) Time Allowed : 3 hours Date : 23 / 5 / 2018 Max Marks: 100

Answer all 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

(i) $P(x) = 0$ Elsewhere, (ii) Graph the probability function. *(5 Marks)*

(B) Prove that

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

(ii) If A, B any two events, then $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ *(5 Marks)*

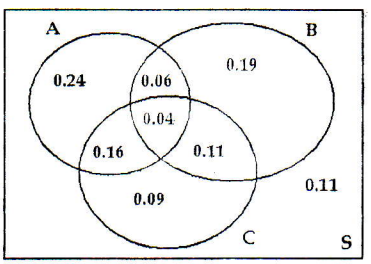
Question 3 (10 MARKS)

(A) In the following data calculate the mean deviation, Variance and Standard Deviation of the following data 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 $P(A \cup B) = \frac{3}{4}$, $P(A' \cap B) = \frac{5}{8}$, 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) Calculate the mean deviation, variance , standard deviation and the coefficient of variation for the following data **(10 Marks)**

Classes	10-20	20-30	30-40	40-50	50-60	total
f	10	20	30	25	15	100

(B) The weights in grams of 50 apples picked out at random from a consignment are as follows:

106	107	76	82	109	107	115	93	187	95	123	125	111
92	86	70	126	68	130	129	139	119	115	128	100	186
84	99	113	204	111	141	136	123	90	115	98	110	78
90	107	81	131	75	84	104	110	80	118	82		

Form the grouped frequency table by dividing the variate range into intervals of width, each corresponding to 20 grams, in such a way that the mid-value of the class corresponds to 70 grams (10 Marks)

With my best wishes

Associate Prof. Dr. Islam M. Eldesoky