

25/12/2017

2017

Kafrelsheikh University.  
Faculty of Engineering.  
Physics & Engineering  
Mathematics Dept.  
First Semester Examination.



Year: 3rd.  
Subject: Eng. Mathematics (4).  
Time Allowed: 3 hours.  
Date: 27 / 12/ 2017.  
Full mark: 70 Marks.

Allowed Tables and Charts : None

Answer all the following questions: [70 Marks]

**Question 1 [35 marks]**

(A) Three horses A, B and C are in race, A is twice as likely to win B and B is twice as likely to win C:

- i) What are their respective probabilities of winning?
- ii) What is the probability that B or C wins? (6 marks)

(B) If X is a continuous random variable has probability density function,

$$f(x) = \begin{cases} kx^2 & 0 < x < 3 \\ 0 & elsewhere \end{cases}$$

Find i) The constant k.

- ii) The value of  $p(1 < X < 2)$ . (6 marks)

(C) If A, B are two event in sample space "S" and number of outcomes of A equal 15, number of outcomes of B equal 40,  $P(A^c \cap B) = 0.2$ , and  $P(A^c \cap B^c) = 0.6$ . Find: (i) The number of outcomes of S.

- (ii) The probability of the events A and B. (10 marks)

(D) Define the following:

- (i) Union, intersection, difference for two events and the complement.
- (ii) Define the correlation and its types with example of each type. (6 marks)

(E) Prove that i)  $P(A') = 1 - P(A)$  ii)  $P(\emptyset) = 0$

- iii)  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ . (7 marks)

**Question 2 [35 marks]**

(A) Find the value of the Pearson correlation coefficient from the following table:

X	42	39	47	32	45	36	40	35	48	37
Y	45	38	49	34	43	42	39	37	46	41

(7 marks)

(B) Given the following frequency table

Classes	15 - 25	25 - 35	35 - 45	45 - 55	55 - 65
Frequency	2	3	6	5	4

Calculate (i) The Arithmetic Mean (ii) The Median. (iii) The Mode.

(8 marks)

(C) Given the following frequency table

Classes	20-30	30-40	40-50	50-60
Frequency	50	35	90	55

Calculate (i) The Harmonic Mean.

(7 marks)

(D) For the following data, 12, 17, 13, 15, 16, 8, 9, 10 Calculate:

(i) The arithmetic mean (ii) Geometric mean (iii) Harmonic mean

(iv) The Median (v) The Mean Deviation. (8 marks)

(E) Calculate the Mean deviation for the following data:

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

(5 marks)

This exam measures the following ILOs												
Question	Q1-a	Q2-a	Q1-b	Q2-b	Q2-c	Q2-e	Q1-c		Q1-d	Q1-e	Q2-e	
Skills	Knowledge & understanding skills				Intellectual Skills				Professional Skills			
					Q2-d	Q1-d						

With our best wishes Prof. Arafa Nasef and Dr. Fathi Abdelzeem