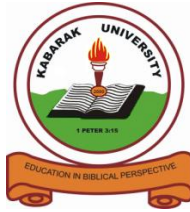


KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND SEMESTER 2017/2018 ACADEMIC YEAR

**EXAMINATION FOR THE DEGREE OF BACHELOR OF ACTUARIAL SCIENCE,
COMPUTER SCIENCE, ECONOMICS MATHEMATICS, MATHEMATICS AND
STATISTICS, COMPUTER AND FORENSIC, TELECOMMUNICATION AND
EDUCATION.**

MATH 123: PROBABILITY AND STATISTICS 1

STREAM: Y1S2

TIME: 11.00-1.00 PM

EXAMINATION SESSION: JAN-APRIL

DATE: 2/04/2019

INSTRUCTIONS:

- Answer **questions ONE and any other TWO**.
 - Indicate question numbers clearly at the top of each page and show working methods clearly.
 - Observe further instructions on the answer booklet.
-

QUESTION ONE (30 MARKS)

- a) The Random variable X , is distributed such that $X \sim B(7, 0.2)$. Find
- i) $P(X=3)$ (2 marks)
 - ii) $P(X > 1)$ (3 marks)
- b) Find the first four central moments about the mean of the following data. (8 marks)
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(1 Peter 3:15)*



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X	2	2.5	3	3.5	4	4.5	5
Freq	5	38	65	92	70	40	10

- c) Obtain Median, Arithmetic Mean, Harmonic Mean, Geometric Mean and Quartile Deviation of the data below. **(12 marks)**

X	1	2	3	4	5	6	7	8	9
Freq	8	10	11	16	20	25	15	9	6

- d) Use the probability distribution table below to calculate mean and standard deviation. **(5 marks)**

X	0	1	2	3
P(X)	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{8}$

QUESTION TWO (20 MARKS)

- a) A researcher carried out a study on the number of miles the students traveled on campus each day and found the following,

1 2 6 7 12 13 2 6 9 5
1 7 3 15 15 4 17 1 14 15
4 16 4 5 8 6 15 18 15 2
9 11 12 1 9 2 10 11 4 10
9 18 8 8 4 14 7 3 2 6

Use the data to prepare a frequency distribution of six classes and use it to find ;

- Median **(3marks)**
 - Lower and upper quartile **(5marks)**
 - Semi-interquartile deviation **(2marks)**
- b) Define a Poisson Distribution **(2marks)**

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- c) Suppose bank customers arrive randomly on weekly afternoons at an average of 3.2 customers every 4 minutes. What is the probability of:
- Exactly 5 customers arriving in a 4-minute interval on a weekday afternoon?
(4 marks)
 - Having more than 7 customers in a 4-minute interval on a weekday afternoon?
(4 marks)

QUESTION THREE

(20 MARKS)

- a) From the information below, calculate Karl Pearson's coefficient of the skewness.
[10 marks]

Measures	Place A	Place B
Mean	256.5	240.8
Median	201.1	201.6
Standard deviation	215.0	181.0

- b) From the prices of shares of X and Y below find which one is more stable in value.

X	35	54	52	53	56	58	52	50	51	49
Y	108	107	105	105	106	107	104	103	104	101

[10 marks]

QUESTION FOUR (20 MARKS)

- a) A collar manufacturer is considering the production of a new style of collar to attract young men. The following statistics of the neck circumference are available based on the measurements of a typical group of students.

Mid-values(m)	12.5	13	13.5	14	14.5	15	15.5	16	16.5
No. of students	4	19	30	63	66	29	18	1	1

Compute the mean , median and standard deviation.

(10mks)

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b) A group of 80 students scored the following marks in a test;

Marks	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of students	2	3	5	9	10	22	24	3	2

- i) Draw an ogive and use it to; **(3marks)**
 - ii) Find the number of students who failed if the pass mark was 40%. **(2marks)**
 - iii) (ii) If the pass mark was lowered by the external examiner to 35% how many more students passed their exam. **(2marks)**
- c) A bag contains 30 tickets numbered from 1 to 30 . One ticket is drawn at random . What is the probability that it is divisible by three or five? **(3marks)**

QUESTION FIVE (20 MARKS)

- a) Define kurtosis **(2 marks)**
- b) With the aid of diagrams discuss three types of kurtosis **(9 marks)**
- c) The first four central moments of a distribution are 0 , 16 , -36 , and 120. Comment on the kurtosis of the distribution . **(3 marks)**
- d) Discuss the following basic concepts as used in probability **(6 marks)**
 - i) Sample space
 - ii) Mutually exclusive events
 - iii) Independent events

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