KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND SEMESTER 2017/2018 ACADEMIC YEAR

EXAMINATION FOR THE DEGREE OF BACHELOR OF ACTUARAL 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~ 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)**

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)	⅛	⅜	⅜	⅛

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 ;

i) Median **(3marks)**

ii) Lower and upper quartile **(5marks)**

iii) Semi-interquatile deviation **(2marks)**

b) Define a Poisson Distribution **(2marks)**

c) Suppose bank customers arrive randomly on weekly afternoons at an average of 3.2 customers every 4 minutes. What is the probability of:

i) Exactly 5 customers arriving in a 4-minute interval on a weekday afternoon?

(4 marks)

ii) 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)**

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