



US

KIBABII UNIVERSITY

DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION

MAIN CAMPUS

UNIVERSITY MAIN EXAMINATIONS

2017/2018 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER

COURSE CODE : ESM 101

COURSE TITLE : QUANTITATIVE SKILLS I

DATE: 3/8/2018

TIME: 9.00-11.00am

INSTRUCTIONS TO CANDIDATES

Attempt question **ONE (1)** and **ANY TWO (2)** other questions
Read additional instructions under various sections

Kibabii University observes **ZERO** tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION ONE

- a) Highlight **FOUR** sources of knowledge (4 marks)
b) The heights of students in centimeters are shown below.

132,132,156,147,162,168,152, 174,141,136,161,148,140,174, 174,162,143,154

Prepare a frequency distribution table using a class size of 10 starting from 130. (4mks)

- c)
- Express in index notation (2 marks)
 - $\text{Log}_{10}1000=1$
 - $\text{Log}_525=2$
 - Simplify without using tables $\text{Log}(p^2-1) - \text{Log}(p+1)$ (3 marks)
- b)
- Use an example for each case to differentiate between proper fraction, improper fraction and mixed number. (3mks)
 - Simplify without using a calculator, giving your answer as a fraction in its simplest form. (3mks)

$$\frac{2\frac{1}{3} - 1\frac{2}{3} \div \frac{5}{9}}{\frac{4}{7} \text{ of } 2\frac{1}{3} - 2\frac{2}{7}}$$

- c) The following table shows a distribution of marks obtained by 50 students. Use it to draw a cumulative frequency curve (5mks)

marks	45-49	50-54	55-59	60-64	65-69	70-74	75-79
No of students	3	9	13	15	5	4	1

- d) In a group of 100 customers at Simba motel, 80 of them ordered mushrooms on their pizza and 72 of them ordered pepper. 60 customers ordered both mushrooms and pepper on their pizza.
- How many customers ordered mushrooms but no pepper? (1 mark)
 - How many customers ordered pepper but no mushrooms? (1 mark)
 - How many customers ordered neither of these two toppings? (1 mark)
- e) State the type of the matrix below and find its determinant. (3 marks)

$$\begin{bmatrix} 3 & 3 \\ -1 & 2 \end{bmatrix}$$

QUESTION TWO

- a) A group of 62 students were surveyed, and it was found that each of the students surveyed liked at least one of the following three fruits: apples, bananas, and carrots.
- 34 liked apples.
 - 30 liked bananas.
 - 33 liked carrots.
 - 11 liked apples and bananas.
 - 15 liked bananas and carrots.
 - 17 liked apples and carrots.
 - 19 liked exactly two of the following fruits: apples, bananas, and carrots
- i. How many students liked apples, but not bananas or carrots? (2 marks)
 - ii. How many students liked carrots, but not bananas or apples? (2 marks)
 - iii. How many students liked all of the three fruits? (2 marks)
 - iv. How many students liked apples and carrots, but not bananas? (2 marks).
 - v. How many students liked none of the three fruits? (2 marks)

- b) The marks obtained by 50 students in class is as shown below

Marks	30	40	50	60	70	80
Frequency	3	4	16	14	8	5

Determine

- (a) The mode (3mk)
- (b) Inter-quartile range (5mks)
- (c) Pass mark if 55% of the students were to pass (2mks)

QUESTION THREE

- a) State any **FOUR** components of time series (4 marks)
- b) The food production in Kakamega county was recorded as shown in the table below.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Production(tons)	45	46	52	49	50	62.5	62	59	60

Compute moving averages of order 5 (5 marks)

- c) Use the information in (b) above to draw a trend curve (4 marks)
- d)
- i. Simplify the expression below without using mathematical tables.
 $\{(243)^{2/5} \times 27^{1/3}\} \div 81^{1/2}$ (4mks)
 - ii. Solve for x in $2^{x+2} = 32$ (3mks)

QUESTION FOUR

The table in cm of 60 children attending a clinic was recorded as shown below.

Height in cm	30-32	33-35	36-38	39-41	42-44
No of children	2	3	15	12	18

Use the data to:

- (a) Draw a frequency polygon superimposed on a histogram (6 marks)
- (b) Calculate
- The mean (4mks)
 - The median (4 marks)
 - The Variance (4mks)
 - standard deviation (2mks)

QUESTION FIVE

a) $A = \begin{pmatrix} 3 & 3 \\ -1 & 2 \end{pmatrix}$ $B = \begin{pmatrix} 5 & 2 \\ 0 & -2 \end{pmatrix}$ and $C = \begin{pmatrix} 7 & -1 \\ 2 & 3 \end{pmatrix}$

i. $BC+A$ (3mks)

ii. $3C-2B$ (3mks)

b) Find the inverse of matrix $A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$. Hence solve the simultaneous equations

$$2x + y = 4$$

$$3x + 4y = 1 \quad (4mks)$$

c) Use crammer's rule to solve the following system of linear equations (10 marks)

$$x + y + 2z = -1$$

$$x + 2y + z = 3$$

$$2x + y + z = 2$$