



MURANG'A UNIVERSITY COLLEGE

A constituent college of Jomo Kenyatta University of Agriculture and Technology

University Examination 2014/2015

END OF SEMESTER EXAMINATION FOR DIPLOMA IN BIOLOGY

ASB 1101 MATHEMATICS

DATE: AUGUST 2015

TIME: 2 HOURS

Instructions: Attempt question **One** and **Two** other questions

Question 1 Compasory (30 marks)

- a) State and briefly explain two methods in which statistical data is collected [4marks]
- b) Differentiate between the following terms as used in statistics
- (i) Primary and Secondary data [2marks]
 - (ii) Population and a sample [2marks]
- b) The weight of distribution of 70 employees of a certain company is given below.

Weight (Kg)	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Frequency	2	10	12	X	10	8	2	3

- (i) Calculate the value of X. [2marks]
 - (ii) State the modal class and calculate the mode [3marks]
 - (iii) State the median class and calculate the median [3marks]
- c) Simplify the following surd $\frac{4}{5}(\sqrt{25} - 2\sqrt{5})$ [3marks]
- d) Rationalize and simplify the denominator of the following surds $\frac{2\sqrt{5}}{2\sqrt{3}+\sqrt{2}}$ [4marks]
- e) Simplify the following $(8x^2)^{\frac{1}{3}} \div x^{-\frac{1}{3}}$ [3marks]
- f) Solve the following equations $4 + \log_3 x + \log_3 3 - \log_3 5 = \log_3 2 + 3$ [4marks]

Question 2 (20 marks)

The table below shows the mathematics examination marks for a class of one hundred students in a certain institution.

Marks out 70	10-19	20-29	30-39	40-49	50-59	60-69
Number of students	4	8	12	22	48	6

Using 34.5 as the assumed mean calculate the

- (i) Mean [3marks]
- (ii) Variance and Standard deviation [7marks]
- (iii) Estimate the mode and median [5marks]
- (iv) Draw an Ogive for the above data and use it to estimate the quartile deviation [5marks]

Question 3 (20 marks)

a) Simplify the following surds and rationalize the denominator where possible

(i) $\sqrt{2}(\sqrt{7} - 3\sqrt{5})$ [2marks]

(ii) $(2\sqrt{5} - 3)(4\sqrt{5} + 3)$ [3marks]

(iii) $3\sqrt{6}(4\sqrt{3} + 2\sqrt{8})$ [3marks]

(iv) $\frac{2\sqrt{2}-\sqrt{3}}{5\sqrt{2}-\sqrt{3}}$ [4marks]

(v) $\frac{2}{\sqrt{2}-\sqrt{3}} + \frac{3}{\sqrt{2}+\sqrt{3}}$ [4marks]

b) Find the value of the unknown in the equations given below

(i) $2^{\frac{1}{2}+x} = 128 \times 2$ [4marks]

Question 4 (20 marks)

The following data represents the reported weights (Kg) for 40 students in a class.

45	65	66	67	72	74	79	69	57	58
65	58	65	67	66	70	69	49	50	52
51	70	79	80	84	49	52	55	63	64
85	90	87	69	81	82	68	69	58	60

- a) Using class intervals of five and starting from 45-49,... prepare a frequency distribution table [4marks]
- b) Draw a Cumulative distribution curve (Ogive) for the above given data [4marks]
- c) Use the graph in (b) to estimate
 - (vi) Median [2marks]
 - (vii) Lower quartile [3marks]
 - (viii) Upper quartile [3marks]
 - (ix) Interquartile range [2marks]
 - (x) Quartile deviation [2marks]

Question 5 (20 marks)

(i) Solve the following:

$$\begin{aligned} x - 2y + 5z &= 21 \\ 3x + y - 2z &= -6 \\ 2x + 3y + z &= 3 \end{aligned}$$

(10 marks)

(ii) Solve the following using matrix method:

$$\begin{aligned}4x - 3y &= 18 \\x + 2y &= -1\end{aligned}$$

(6marks)

(iii) The determinant of the matrix below is 6, find the value of x.

$$\begin{bmatrix} x & x \\ 4 & x \end{bmatrix}$$

(4marks)