CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN ANIMAL SCIENCE

MATH 00121: INTRODUCTION TO BASIC MATHEMATICS

STERAMS: CERT. (ANIMAL SCIENCE, Y1S2) **TIME: 2 HOURS**

DAY/DATE: MONDAY 11/07/2016 **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions.**
- **Do NOT write on the question paper.**

QUESTION ONE (COMPULSORY) – (30 MARKS)

(a) Define the following terms: (4 marks)

(i) Factors

(ii) Composite numbers

(iii) Rational numbers

(iv) Integers

(b) Three tanks are capable of holding 36, 84, 90, litres of milk. Determine the capacity of the greatest vessel which can be used to fill each one of them an exact number of times. (3 marks)

(c) The equation of a circle is given by $x^2 - 6x + y^2 + 4y - 3 = 0$. Determine the centre and the radius of the circle. (4 marks)

(d) Find the equation of a line perpendicular to the line segment joining point A = (-3, 4) to B (-7, 6) and passing through the midpoint of the line segment. (4 marks)

(e) Without using logarithm tables find the value of

$\log_{10} 96 + 3\log_{10} 5 - \log_{10} 12$ (3 marks)

(f) Use binomial expansion to evaluate $(1.02)^6$ to 4 s.f. (4 marks)

(g) Find the ratio a: c if

a: b = 1:5 b: c = 1:9

(h) 14 workers can do a piece of work in 30 days. If the job is to be done in 12 days, how many more workers must be employed. (3 marks)

(i) Find the sum of the first 9 terms of the G.P 8 + 24 + 72 + …. (3 marks)

QUESTION TWO (20 MARKS)

I. Forty students in form two class were weighted and their masses recorded to the nearest kilogram as shown below.

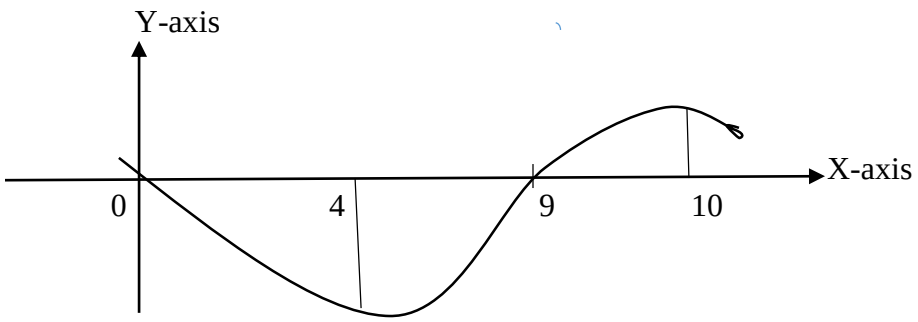
45	48	56	39	47	36	45	49	50	46
37	46	33	43	51	42	47	39	42	48
47	40	46	41	45	43	46	50	38	45
54	42	51	39	42	45	44	35	52	46

(a) Using class interval of 5 kg tabulate this data in a frequency table. (4 marks)

(b) Find the model class. (1 mark)

(c) Modify the table and use it to calculate the mean mass of the students. (5 marks)

II. (a) Find the area enclosed by the curve $y = x^2 - 10x + 9$ the x- axis and the lines$x = 4\ and\ x = 10$. (10 mas)



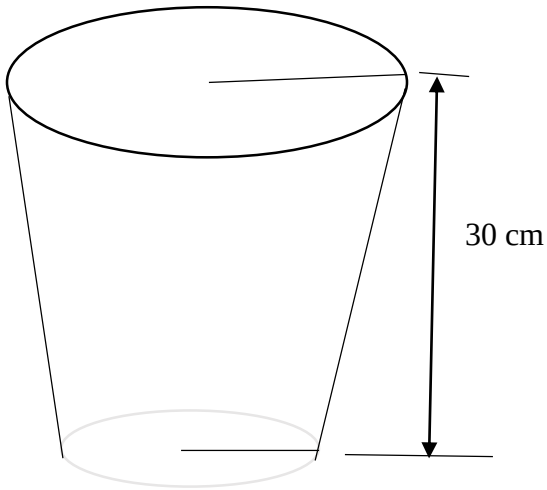
(b) A ball is thrown upwards with a velocity of 40 m/s. Determine an expression in terms of t for;

(i) Its velocity.

(ii) Its height above the point of projection. (5 marks)
(Take acceleration due to gravity to be 10m/s^2)

QUESTION THREE (20 MARKS)

I The diagram on the table below shows a frustum which represents a bucket with an open and diameter of 30 cm and a bottom diameter of 24 cm. The bucket is 30 cm deep and it is used to fill an empty cylindrical tank of diameter 1.4 m and height 1.2 m.



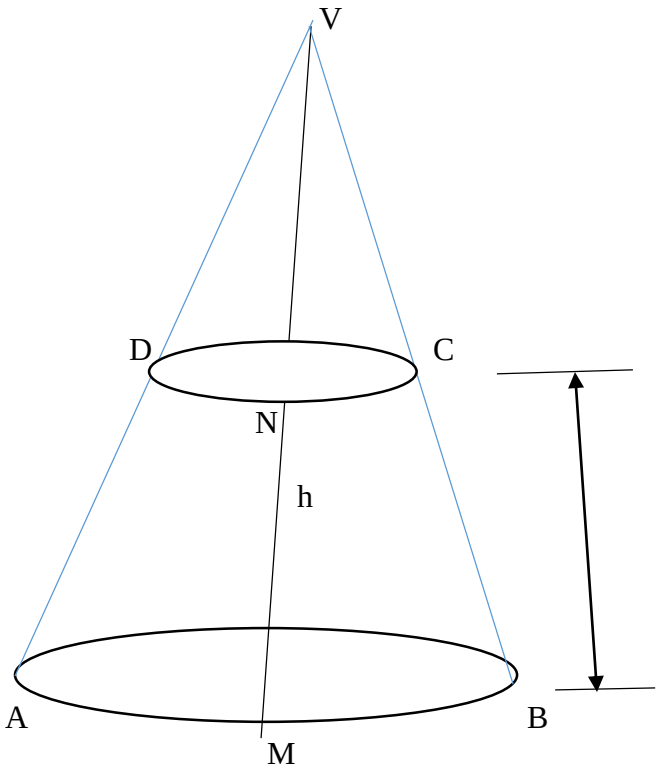
Calculate

(a) The capacity of the bucket in litres (6 marks)

(b) The capacity of the tank in litres (2 marks)

(c) Determine the number of buckets that must be drawn in order to fill the tank. (2 marks)

II The diagram below represents a right cone of base radius 28 cm from which a small cone is cut off to form a frustum. The top radius of the frustum is 21 cm and its height is 10 cm as shown.



Calculate to the nearest whole number the total surface area of the frustum. (10 marks)

QUESTION FOUR (20 MARKS)

I (a) Solve for x in the equation

$9^{(x-1)} \times 3^{(2x+1)} = 243.$ (3 marks)

(b) (i) Solve the simultaneous inequality below and represent the combined solution on a number line.

$2x - 5 \leq 10 - 3x < x + 18$ (4 marks)

(ii) On a graph paper illustrate the region which satisfies all the inequalities below.

I. $3y - 2x \geq 3$

II $2y - x < 10$

III $y + x \geq 5$

IV $x < 6$

V $y \geq 3$ (6 marks)

(c) Solve the equation

$\frac{2x+1}{3} - \frac{x-3}{2} = \frac{4x-1}{6}$ (2 marks)

II If A is a set given that:

$A = \{a, b, c, d, e\}$

(i) Which of the sets: $B = \{b, c, d\}$ and $C = \{u, v, w\}$ is a subject of A. Explain (1 mark)

(ii) Find AnB (2 marks)

(iii) AUC (2 marks)

QUESTION FIVE (20 MARKS)

(a) The 20th term of an arithmetic sequence is 60 and 16th term is 20. Find the first term and the common difference. (4 marks)

(b) The sum of the first eight terms of an arithmetic progression (A.P) is 220. If the third term is 17, find the sum of the first six terms. (5 marks)

(c) The sum of the first three terms of a geometric series is 26. If the common ratio is 3, find the sum of the first of the six terms. (5 marks)

(d) A rectangular slab measures 8 cm by 2 cm by 14 cm and has a mass of 610 g. Calculate the density of glass in kg/m^3 (3 marks)

(e) The table below shows a timetable for a public service vehicle plying between two towns A and D via towns B and C.

Town	Arrival time	Departure time
A	–	8.20 a.m.
B	10.40 p.m.	11.00 a.m.
C	2.30 p.m	2.50 p.m.
D	4.00 p.m	–

(i) How long does it take to travel from town A to D? (2 marks)

(ii) What time does the vehicle take to travel from town C to D.? (1 mark)
