SECTION A (40 MARKS)

*Answer **All** questions in this section*

1. Solve the equation : $\frac{1}{2}\log_2 y - \log_2 3 = 1$ (04 marks)
2. Find the equation of a straight line passing through the point $(-3, -2)$ which cuts the $y-axis$ 3 *units* above the origin. (04 marks)
3. Given that $n(P \cap Q') = 18, n(P \cap Q) = 4, n(Q) = 7, n(P \cap Q') = \frac{3}{4}n(P \cup Q)'$ and $n(\in) = 7y$. Find the
   (i) $n(P \cup Q)'$
   (ii) Value of y (02 marks)
4. Express $2^{1/3} + (16)^{1/3}$ in the form $a^{1/3}$. Hence state the value of a (02 marks)
5. Given that $f(x)$ is inversely proportional to 3^x and that $(f-1) = 108$, find $f(2)$ (04 marks)
6. The line $2y + x = 4$ and $y = M + x$ intersect at the point $(n, 3)$ determine the values of m and n (04 marks)
7. Okello sold a book at 10% loss. If he had sold the book at 10% profit, he would have earned $Ugx.\ 2880$ more. Find the cost price of the book. (04 marks)
8. Given that the coordinates of A, B and C are $(1,5), (2,5)$ and $(-4,-4)$ respectively. If $AB = CD$, find the magnitude of OD (04 marks)
9. Two containers of similar shape have surface areas of $41.3cm^2$ and $165.2cm^2$. If the smaller container can hold 500 litres of water, find the capacity of the larger container. (04 marks)
10. A bus left town A at 2245hours and arrived in town B at 0035hours. If the average speed for the whole journey was 300km/hr find the distance covered by the bus. (04 marks)

$2y + x = 4$

$2y + -2 = 4$

$2y = 4 + 2$

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

$y = m + x$

$y = 5 + -2$

$y = 3$

$2^{1(1/3)}$

16

2 16

2 4

2 2

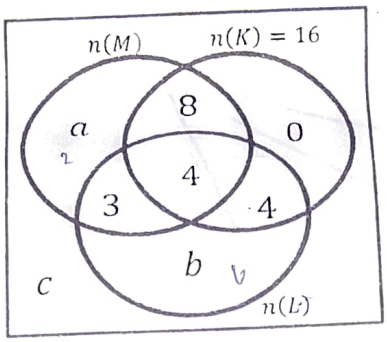
2 1

2^4

SECTION B

*Answer only **five** questions from this section. All questions carry equal marks*

11. In a farmers meeting, the number of farmers who enjoy eating Maize(M), Kalo(K) and Lumonde (L) is shown in the venn diagram below



Give that $n(M') = 17$, $n(K \cup L)' = 14$ and $n(K \cup K') = 40$.

(a) Determine the values of a, b *and* c (07 marks)

(b) Find the number of farmers who do not enjoy eating Kalo. (02 marks)

(c) If a farmer is selected at random from the meeting, what is the probability that the farmer eats atmost one of the food staff? (03 marks)

12. Nanfuka is a sales woman. She earns a basic monthly salary of Ugx.400, 000. In addition, she is paid a commission per month as shown in the table below

Sales Ugx.	Commission Rate (%)
001 – 100.000	5
100.001 – 300.000	10
300.001 – 500.000	15
500.001 and Above	20

(a) If Nanfuka earned a total commission of Ugx.115.000, calculate:

(i) Her total salary by the end of the month. (02 marks)

(ii) The commission she made on sales above Ugx.500.000 (06 marks)

(iii) The total sales she made (02 marks)

(b) What were the sales above Ugx.500.000 (02 marks)

13. A function $g(x) = x^2 + 6$ and $h(x) = \frac{g(x)-g(4)}{g(x)-g(3)}$

(a) Determine :

(i) x for which $g(x) = 31$ (02 mark)

(ii) $h(x)$ (04 mark)

(b) Find:

(i) $h(-2)$ (02 mark)

(ii) x for which $h(x)$ is meaningless (02 mark)

(iii) x for which $h(x)$ is null (02 mark)

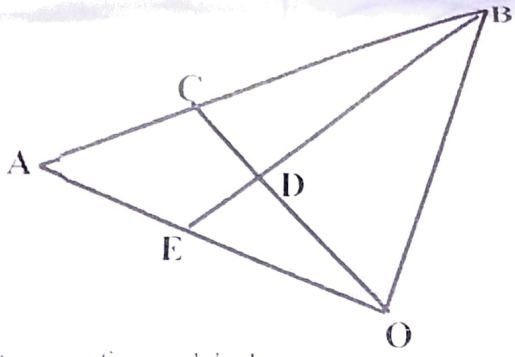
14. (a) Given that $\frac{6^n \times 10^6}{2^{10} \times 3^n \times 5^6} = 1$ Find the value of n (06 marks)

(b). The time (t) taken to build a housing estate varies directly as h, the number of houses built and inversely as n. the number of men who build them.

(i) write down an expression for t in terms of h and n (04 marks)

(ii) If it takes 100 men 4 months to build an 8 house estate, how long will it take 25 men to build a 15 house estate? (02 marks)

15. In the figure below, C divides $\overline{AB}$ in the ratio of 1: 2. Given that $\boldsymbol{OB} = \boldsymbol{b}$ and $\boldsymbol{AO} = \boldsymbol{a}$



(a) Express in terms of a and b the vectors

(i) BA (02 marks)

(ii) AC (02 marks)

(iii) BD (04 marks)

(b) If E is the mid-point of OA. find the ratio of $\overline{BD}: \overline{BE}$ (04 marks)

16. Mbale and Iganga are $100Km$ apart. At $7:30am$, when Peter was $10Km$ from Mbale. riding at $30Km/hr$ towards Iganga. James sets off from Iganga riding towards Mbale at the same speed of $3Km/hr$. When they met. James increased his speed so that they arrived where they were going at the same time.

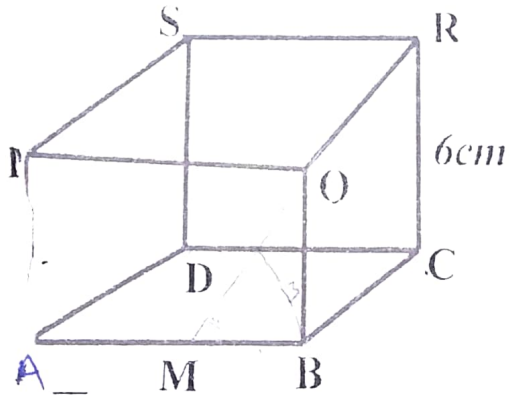
(a) Using a scale of $1cm: 10Km$ and $4cm: 1hour$. draw a distance time graph showing the routes of peter and James. (07 marks)

(b) When and at what distances from Mbale did they met (02 marks)

(c) Determine how may Km/hr did James increase his speed. (03 marks)

17. (a) Find the area of a regular hexagon of sides 12cm (06 marks)

(b) The diagram below show a cube of side 6cm. M is the mid-point of AB



Find the angle between $\overline{MR}$ and the plane ABCD to the nearest degree. (06 marks)

END