

END OF TERM II EXAMS

S.3 MATHEMATICS

TIME: 2 HRS 30 MINS

INSTRUCTIONS

Attempt all questions in section A

Choose any five questions in section

Be neat in your workings and untidy work leads to loss of marks

SECTION A (40 marks)

1. Express 0.96 in the form $\frac{a}{b}$ where a and b are integers such that $b \neq 0$

2. Find the equation of a line passing the point(3,-1) and the origin

3. Solve the simultaneous equations given below

$$3x + y = 23$$

$$4x + 3y = 48$$

4. If A varies directly as B and $A=25$ where $B=5$. Find A when $B=40$

5. Convert 72kmh^{-1} to ms^{-1}

6. Work out the following matrix

$$\begin{pmatrix} 2 & 1 \\ 4 & -1 \end{pmatrix} + \begin{pmatrix} 7 & 3 \\ 1 & 2 \end{pmatrix}$$

7. Solve the simultaneous equation below

$$3x + y = 17$$

$$x - 2y = 3$$

8. Make V the subject of the formula

$$\frac{1}{F} = \frac{1}{u} + \frac{1}{v} \quad \text{Hence find V if } u=8 \text{ and } F=20$$

9. When the translation $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ was applied to a point A, it mapped onto the point $A^1(1,-4)$. What are the coordinates of A?

10. A job can be completed in 12 months by 58 workers. If the same job has to

be completed in 8 months, how many workers should be added?

SECTION B

Attempt only 5 questions in this section

11. a) If $\frac{a+2b}{a-2b} = \frac{1}{2}$, find the value of $\frac{a}{b}$

b) Solve the equation $2\binom{x}{y} + 3\binom{x}{2y} = \binom{40}{32}$

12. In the Venn diagram above, the number of elements in various region are as indicated. If $n(A \cup B \cup C) = 150$, find the value of x

b) In a certain school there are 50 pupils studying both basic maths, and additional mathematics, school regulations require that additional mathematics pupil must come from the basic mathematics class. In the school, 10 pupils do not study Basic mathematics but not additional mathematics; how many pupils

- i. Are in the school?
- ii. Study either basic mathematics or additional mathematics?
- iii. Do not study additional mathematics?

13. The scores of a physics test taken by 60 students were recorded as follows

30	56	21	49	34	58	22	38	27
25	34	48	33	58	20	34	30	50
25	50	36	29	34	21	61	33	51
26	28	45	36	59	26	60	42	21
43	24	30	27	26	56	35	32	31
26	20	63	35	52	41	56	41	32
30	36	53	63	57	54			

- a) Arrange these scores into grouped frequency distribution table starting with the classes 20-24, 25-29, 30-34, ...
- b) Calculate the mean score

- c) Draw the histogram and use it to estimate the mode
- d) Draw the Ogive and use it to estimate the median

14. a) Given $Z = \begin{pmatrix} 4 & 2 \\ -1 & 1 \end{pmatrix}$ find the determinant of Z

b) Given that $A = \begin{pmatrix} 6 & -1 \\ -3 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 4 & 2 \\ -5 & -1 \end{pmatrix}$ calculate

- i. AB
- ii. A^2
- iii. BA

17. A cake is made up of the ingredients; flour, oil, eggs and sugar. A sample of three cakes made by a certain bakery was found to have been made from;

- 2 kgs of flour, 1 litre of oil, 8 eggs and 250 gms of sugar.
- 3 kgs of flour, 2 litres of oil, 12 eggs and 450 gms of sugar.
- 5 kgs of flour, 2.5 litres of oil, 20 eggs and 900 gms of sugar respectively.

In 1997, the cost of a kg of flour, a litre of oil, an egg and a kg of sugar were shs 1800, shs 3000, shs 100 and shs 1000 respectively.

In 1999, each of these items cost shs 2000, shs 3500, shs 200 and shs 1200 respectively.

- i. Write down a 3×4 matrix to represent the ingredient items of the cakes and a 4×2 matrix for the costs of the items in the two years.
- ii. Using matrix multiplication, calculate the total cost of making the three cakes for each of the years 1997 and 1999.
- iii. Given that a shs 8400 profit was made on the sales of the three cakes in 1997. Determine the price at which the three cakes were sold in 1999 if the same percentage profit was made on the sales of the three cakes in 1997 and 1999. Determine the price at which the three cakes were sold in 1999.

18. a) When a translation $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ was applied to a point A, it mapped into a point $A^I(1, -4)$, what are the coordinates of A?

b) Triangle ABC has its vertices at A (3, 0) B (5, 0) and C(5,3). The triangle is given a positive quarter turn about the origin (0, 0) to produce $A^I B^I C^I$ the image of ABC followed by a reflection in the line $x + y = 0$ to produce $A^{II} B^{II} C^{II}$

- i. Determine the coordinates of $A^I B^I C^I$ and $A^{II} B^{II} C^{II}$
- ii. Describe fully a single transformation which maps $A^{II} B^{II} C^{II}$

END

*****STRUGGLE CONTINUA*****