

# UNEB U.C.E MATHEMATICS (PAPER 1) 2006

## SECTION A

1. Simplify: 
$$\frac{(12)^{\frac{3}{2}} \times (16)^{\frac{1}{8}}}{(27)^{\frac{1}{6}} \times (18)^{\frac{1}{2}}}$$

2. Solve for  $x$  in the inequality:  $(x+2)(x-4) < x^2 - 6$

3. Express:  $\frac{1+\sqrt{3}}{2+\sqrt{3}}$  in the form  $a+b\sqrt{3}$ . hence evaluate  $\frac{1+\sqrt{3}}{2+\sqrt{3}}$  correct to 3 significant figure if  $\sqrt{3}=1.732$

4. A trader made a 35% profit after selling a goat at shs45, 900. How much profit did the trader get?

5. Simplify:  $\log 75 + 2 \log 2 - \log 3$ .

6. Find the value of  $a$  and  $b$  such that: 
$$\begin{pmatrix} 3 & b \\ 4 & a \end{pmatrix} \begin{pmatrix} 7a \\ 2 \end{pmatrix} = \begin{pmatrix} 43 \\ 30 \end{pmatrix}$$

7. A line of gradient  $\frac{7}{9}$  passing through the point  $Q(3, 4)$ , cuts the  $y$  - axis at a point  $P$ . find the co-ordinates of  $P$ .

8. The height of a small box is 2cm and its volume  $10\text{cm}^3$ . If the height of a small box is 6cm, what is its volume?

9. The points;  $A, B, C$  and  $D$  are on the circumference, if a circle of centre  $O$  and  $\angle ADC = 30^\circ$ . Find the values of the marked angles  $a$  and  $b$ .

## CIRCLE

10. Solve the equation: 
$$x = \frac{15-x^2}{2}$$

## SECTION B

11. Shown below are marks obtained by 50 candidates in a certain **S4** mathematics mock examination.

25	30	29	60	72	59	40	40	62	70
40	39	62	65	40	59	39	43	80	21
58	29	19	25	30	32	56	59	40	55
69	90	81	50	31	45	60	20	51	49
31	30	56	58	50	50	50	60	40	70

- a) (i) construct a grouped frequency table having class intervals of 10 marks, beginning with the 15 - 24 class group.  
(ii) use your grouped frequency table to calculate the mean mark of the mock examination.

b) Represent the above mock results on a histogram and use it to estimate the mode.

12. a) (i) Plot on a graph the triangle **ABC** whose vertices are (1, 1), (3, 2) and (2, 4) respectively.

(ii) on the same graph, enlarge the triangle **ABC** using (-1, -1) as the centre of enlargement and a scale factor of 2 to obtain its image **A'B'C'**.

(iii) state the coordinates of **A'B'C'** the image of triangle **ABC**.

b) using your graph, find the area of the triangle **ABC**. Hence determine the area of the triangle **A'B'C'**.

13. using a pair of compasses and ruler only:

a) (i) construct triangle **ABC**, such that  $\overline{AB} = 10.0\text{cm}$ ,  $\overline{BC} = 9.2\text{cm}$ ,  $\angle ABC = 105^\circ$ ,

(ii) measure length  $\overline{AC}$

b) (i) construct an inscribed circle of triangle **ABC** with center **O**,

(ii) measure the radius of the circle.

14. A poultry farm has three poultry units; **A**, **B** and **C**. unit **A** produces 30 trays of eggs and 20 broilers every month. Unit **B** produces 40 trays of eggs and 15 broilers and unit **C**, 35 trays of eggs and 10 broilers during the same period if a tray of eggs costs shs3,000 and a broiler shs4,000.

a) (i) represent the above information in matrix form of order  $3 \times 2$  for the eggs and broilers.

(ii) form a  $2 \times 1$  cost matrix produced on the farm for the eggs and broilers.

(iii) find the sales of the farm if all eggs and broilers were sold.

b) If the farm charges a 17% VAT, find the total income from the sales of the farm every month.

15. a) An FM radio commercial section charges fees for any radio announcements as follows:

The first ten words shs5,000 and any additional word shs100 each. Find the total charge for the announcement below:

"Mr. John Musoke, the chairman organizing committee of the wedding preparatory meetings of Mr. James Lima and Miss Vanessa Tukko announces the cancellation of the wedding meetings which were scheduled to begin on Wednesday, 11<sup>th</sup> August, 2004 at Kalori Gardens, National theatre Kampala. Any inconveniences caused are highly regretted. A new date and venue for the meetings will be announced later."

b) Mr. Ronald Anguyo bought a car at shs4,500,000. The car depreciates at a rate of 12% per annum. After 2 years, Ronald decided to sell the car to his friend at 25% less of the value of the car then. Find the price at which his friend bought the car.

16. At a graduation party, the guests are to be served with beer and soda. At least twice as many crates of beer as crates of soda are needed. A crate of beer contains 25 bottles and a crate of soda contains 24 bottles. More than 200 bottles of beer and soda are needed. A maximum of shs500,000 may be spent on beer and soda. Assume a crate of beer costs shs40,000 and that of the soda costs shs15,000.

a) (i) form inequalities to represent the above statements.

(ii) represent the above inequalities on the same axes.

(iii) by shading the unwanted region, represent the region satisfying the inequalities in (a)(i) above.

b) From your graph, find the number of crates of beer and soda that should be bought if the cost is to be as low as possible. Find the amount that was paid for these crates of beer and soda.

17. TRAPEZIUM

The figure **ABCD** shows a plot of land in form of a trapezium. Lengths  $\overline{BC} = 6\text{m}$ ,  $\overline{CD} = 21\text{m}$  and  $\overline{DA} = 10\text{m}$ .

a) Find the:

(i) Length  $\overline{AB}$  of the plot,

(ii) Area of the plot.

b) The diagram below shows road **AO** intersecting road **OB** at  $90^\circ$  at point **O**. the two roads are also connected to **A** and **B** by an arc - like shaped road measuring a quarter of a circle 70m in radius.

SQUARE

Find the distance saved by a motorist who goes through the arc-shaped road instead of going through **AO** and **OB**.