

456/2

**MATHEMATICS Paper**

2

21 July 2014

2 ½ hours

**ENTEBBE JOINT EXAMINATION BUREAU Uganda**

**Certificate of Education MATHEMATICS**

Paper 2

2 hours 30 minutes

**INSTRUCTIONS TO CANDIDATES:**

*Attempt **all** questions in Section **A** and any **five** in Section **B**.*

*Any extra question(s) answered shall **not** be marked*

*All necessary calculations must be done in the answer booklet provided.  
Therefore, no paper should be given for rough work*

*Silent, non - programmable scientific calculators and mathematical tables 'with a list of formulae' may be used.*

*Graph papers **are** provided.*

**O-M-2**      **2014 Entebbe Joint Examination Bureau: Mathematics Turn Over**

**SECTION A: 40 MARKS**

Attempt all questions

1. Express  $\frac{3 + \sqrt{3}}{3 + 2\sqrt{3}}$  in the form  $a + b\sqrt{3}$ . Hence state the values of  $a$  and  $b$ . (04 marks)

2. Simplify:  $\frac{1}{2} \log_2^{16} + 2 \log_2^3 - \log_2^{18}$  (04 marks)

3. Simplify:  $\frac{\left(-\frac{1}{2}\right)^{\frac{2}{3}} \cdot \left(\frac{-2}{3}\right)}{\left(\frac{3}{4} - 2\frac{3}{4}\right) \cdot \frac{11}{8}} \times \left(8 - 4\frac{1}{2}\right)$  (04 marks)

4. Given that  $\underline{OB} = \begin{bmatrix} 5 \\ -8 \end{bmatrix}$  and  $\underline{OA} = \begin{bmatrix} -16 \\ -36 \end{bmatrix}$

(i) Determine the column vector for  $\underline{AB}$

(ii) Hence find the length of vector  $AB$ . (04 marks)

5. Given that  $\tan A = -3/4$  and  $0^\circ \leq A \leq 180^\circ$ .

Find the value of  $\frac{\cos A - \sin A}{\cos A + \sin A}$  (04 marks)

6. Two square base pyramids have their volumes in the ratio 64: 27. The sum of their cross - sectional area is  $50 \text{ cm}^2$ . Find the cross - sectional area of the large pyramid. (04 marks)

7. Use mathematical tables to evaluate:

$$\frac{0.000169 \times 38.2}{0.0015 \times 0.03} \text{ correct to 3 decimal places.}$$

(04 marks)

8. Solve the simultaneous equations:

$$2 + 3 = 1$$

a b

$$a + b = 2 \quad (04 \text{ marks})$$

9. A bag contains 5 Red and 7 White balls. Two balls are drawn from the bag one after the other without replacement. Find the probability of drawing

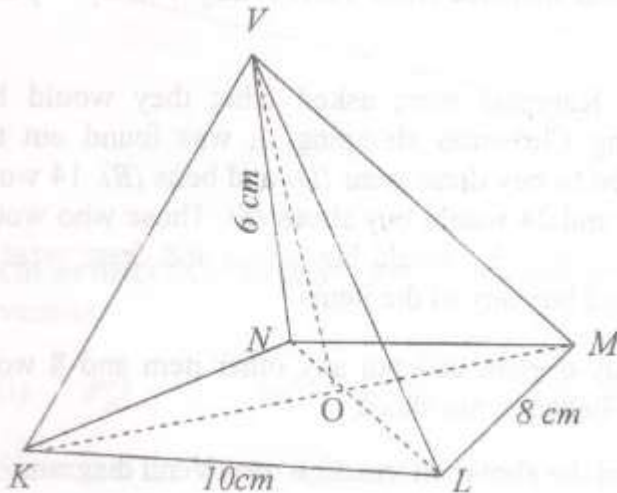
(i) The first ball being Red.

(ii) Balls of different colours. (04 marks)

10. A tourist has KShs 129,000 to change in dollars at the exchange rate of \$1 = KShs 86. How much would he receive in US\$ at an exchange rate of \$1 = US\$ 2,400? (04 marks)

**SECTION B: 60 Marks**

11.



The figure above is a right pyramid with a rectangular base of dimensions 10 cm by 8 cm and height 6 cm. B is the midpoint of LM

Find the:

- length of the slanting edge VL. (06 marks)
  - the angle between the VK and the base, (02 marks)
  - the angle between VLM and the base. (02 marks)
  - the angle between VOB and VOL (02 marks)
12. Kumi is 120 km away from Tororo. A tractor leaves Kumi for Tororo at 7.00 am at a steady speed of  $20 \text{ kmh}^{-1}$ . Three hours later, it stops for a break that lasted two hours, after which it resumes its journey non-stop at a speed of  $30 \text{ kmh}^{-1}$ . At 8.00 am, a bus leaves Tororo for Kumi non-stop at a constant speed of  $30 \text{ kmh}^{-1}$ .
- Using a scale of 2 cm 1 hour on the X-axis and 2 cm 10 km on the y-axis, draw on the same axes graphs to represent the motion of the two vehicles. (07 marks)
  - From your graph. determine:
    - Their times of arrival at respective destinations. (02 marks)
    - At what time they will meet on the way. (01 mark)
    - What distance from Tororo they will by-pass each other. (02 marks)

13. 70 women in Kampala were asked what they would buy for their husbands during Christmas shopping. It was found out that an equal number intended to buy dress wear ( $D$ ) and belts ( $B$ ). 14 would buy dress ware and belts and 24 would buy shoes ( $S$ ). Those who would buy shoes only are twice those who would buy shoes and dress wear but now belts and 10 would not buy any of the items. If 13 would buy dresses and not any other item and 8 would buy both dress wear and belts bur not shoes:

- (a) Represent the above information on a Venn diagram. (08 marks)
- (b) Find the number of women who bought:
- (i) Belts or shoes but not dress wear. ,
- (ii) Either belts or shoes. (02 marks)
- (c) If a woman is chosen at random from the group, find the probability that she bought at least two items. (02 marks)

14. (a) Given that  $f(x) = 4 + x^2$  and  $g(x) = x + 4$ ,  
 $4 + 5x$

Find: (i)  $gf(5)$  (04 marks)

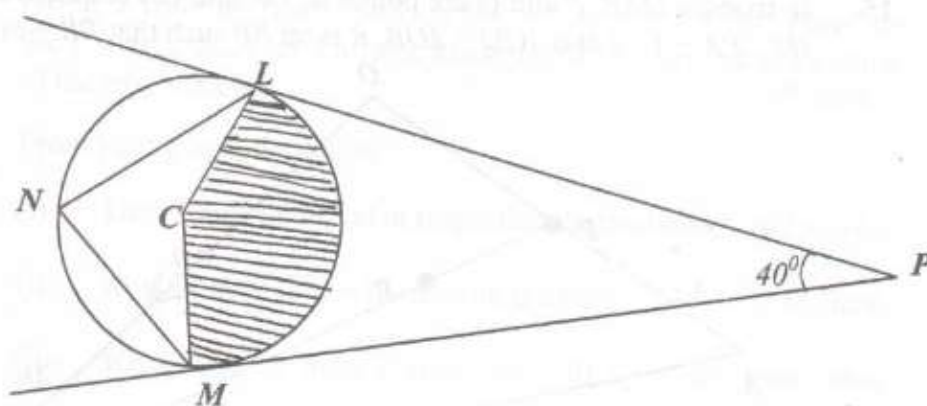
(ii) the value of  $x$  for which  $gf(x)$  is meaningless. (02 marks)

- (b) Given that  $f(x) = px + q$ . and  $f(30) = 13$ . And  $f(-15) = 4$ .

Find: (i) the value of  $p$  and  $q$ . (04 marks,

(ii)  $f(20)$  (02 marks)

17.



$PL$  and  $PM$  are tangents from point  $P$  to the circle with a centre  $C$  and radius 5cm.

- (a) Calculate the angle  $LCM$  formed by the minor arc  $LM$  (03 marks)

- (b) Calculate the area of the shaded sector  $LCM$ , correct to 3 significant figures. *(03 marks)*
- (c) Calculate the area of the quadrilateral  $LCMN$  correct to significant figures. *(06 marks)*

**END**