**456/2**

**MATHEMATICS**

**PAPER 2**

**JULY/AUGUST 2011**

**2½ HOURS**

**JOINT MOCK EXAMINATIONS 2011**

**Uganda Certificate of Education**

**MATHEMATICS**

**PAPER 2**

**2 HOURS 30 MINUTES**

**INSTRUCTIONS TO CANDIDATES**

Answer **all** questions in section **A** and any **five** questions form section **B**.

All necessary calculations must be shown clearly with the rest of the answer.

Graph paper is provided

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

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**SECTION A (40 marks)**

1. Express 2.069069……………. in the form a/b , where b = 0 in its simplest form.

2. P and Q are two sets, given that n(P) = 11, n(Q) = 8 and n(PUQ) = 13, determine

(i) n(PnQ)

(ii) n(PnQ1)

3. A school’s fine art department bought 50 pencils at a total cost of 19,600/. Some pencils

cost shs 200 each while others cost 500 each. Find the number of pencils which were bought sh 500.

4. Use logarithms to evaluate 0.0586 1/3

5. Given that c varies inversely as the square root of d and c = 5 when d = 9. Find

1. The equation connecting c and d
2. The value of d when c = 4

6. A radio system was sold at 218,300/=, thereby making a profit of 18%. What would be

the selling price if the profit was to increase by 4%?

7. Given that tan θ = and that 2700 ≤ θ ≤ 3600,

Without using mathematical tables or calculator, find

a. Sin θ

b. Cos θ

8. If express b in terms of T,r and n

9. The figure below shows a trapezium PQRS in which SR = 12 cm, RQ = 15cm and angle PQR = 580

S 12 cm R

15cm

P 580 Q

25cm

Calculate its area.

10. An electronics dealer charges 21% more under hire purchase. The market price of a

television set is shs 450,000. Akelllo pays an initial deposit of sh 195,000/=.Calculate the

amount of each monthly installment if she pays the balance in 12 equal monthly

installments.

**SECTION B (60marks)**

11. a) Draw the graph of y = 7 – 3x - 2x2 for values of x for -3 ≤ x ≤ 2

b) On the same axes and using the same scale, draw the line y = 2 – 3x

c) Use your graphs to solve the equations

(i) 5- 2x2 = 0

(ii) 4 – 3x – 2x2= 0

12. A ship leaves port K and sails to port L, 268km away on a bearing of 0500, it then sails

from L to M on a bearing of 1600 and for 232 km, from port M, the ship sails to port N on

a bearing of 2150, at a speed of 50km/h for 5.6 hours.

a) Using a scale of 1cm to represent 40km, draw an accurate diagram to represent the

ships’ journey.

b) From your diagram, determine the bearing and distance of port K from port N

c) If the ship sails back to port K from port N at an average speed of 45km/h, calculate

how long, in hours, it would take to sail for the whole journey.

13 The figure below shows a cuboid with AD = 18cm, DC = 31.5 cm and CG= 42cm

A E

18cm H F

D B

31.5cm

G

C 42 cm

Calculate the

1. Length of CE
2. Angle CE makes with the plane CDHG
3. Angle CE makes with plane ADHE
4. Angle between the planes AEGC and EFBA

14. A quadrilateral PQRS has vertices P(1,3) Q(-1,6) R(2,6) and S(3,4). The transformation K

with matrix Ķ 0 -1 maps PQRS onto P’Q’R’S’ and the transformation Lwith matrix

-1 0

L = 0 -1 maps P’Q’R’S’ on to P”Q”R”S”

1 0

1. Draw PQRS and its images on the same axes and write down their coordinates.
2. Determine the matrix of the single transformation which maps P”Q”R”S” on to PQRS.

15.

C D

A

In the figure, CD is a chord of the circle, centre O. OA is the perpendicular bisector of CD.

Givrn that CD = 12 cm and AN = 2cm, calculate

1. The radius of the circle
2. Angle COD
3. The area of sector OCAD

16 64 cm

80 cm

48cm

The figure above shows a frustrum used in constructing a musical drum. The top and

bottom diameters of the frustrum are 64cm and 48cm respectively. The frustrum is 80cm

high. Given that all the outside surfaces of the drum are covered with leather, calculate the

a) Volume of the drum in litres

b) Total surface area covered with leather in square metres.

17. In a certain country, the income tax structure has it that a person’s gross monthly income

has certain allowances deducted from it before being subjected to taxation the allowances

are as follows.

Family relief and insurance sh 450,000 per annum

Marriage allowance, one fifteenth of the gross monthly income,

Housing shs 45,000 per month

Water and electricity sh 14,500 per month,

Medical shs 270,000 per annum

Transport shs 1,200 per day (22 working days)

Family allowances for four children only with the following rates sh 6400 for each child

above the age of 15 years, sh 7,500 for a child above 10 years but below 15 years and

sh 9,200 for a child below 10 years.

Kudjo has a family for four children with two of them below the age of 8 years, the elder

child is 19 and the other 13 years.

Given that he earns shs 840,000 per month calculate

a) The taxable incomes and the income tax he pays under the income tax rates below.

|  |  |
| --- | --- |
| **Taxable income (shs)** | **Tax rate (%)** |
| 0- 20,000 | 9.5 |
| 20,001 – 90,000 | 17.5 |
| 90,001 – 180,000 | 25.0 |
| 180,001 – 295,000 | 32.5 |
| 295,001 – 465,000 | 38.0 |
| Above 465,000 | 49.5 |

a) What percentage of his gross monthly income is paid in tax?

**END**