**456/2**

**MATHEMATICS**

**Paper 2**

**Jul/Aug 2016**

**2 ½ Hours**

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**MUKONO EXAMINATIONS COUNCIL**

**Uganda Certificate of Education**

**MATHEMATICS**

Paper 2

**2 Hours 30 Minutes**

**INSTRUCTIONS TO CANDIDATES**

* *Answer all questions in section* ***A*** *and any* ***five*** *questions from section* ***B***
* *Any additional question(s) answered will not be marked.*
* *All necessary calculations* ***must*** *be done in the answer booklet provided. Therefore, no paper should be given for rough work.*
* *Graph paper is provided.*
* *Silent, non – programmable scientific calculators and mathematical tables with a list of formulae may be used.*

**SECTION A (40MARKS)**

*Attempt* ***all*** *questions in this section*

1. Convert the recurring decimal 10.272727……… to a fraction. ***(04marks)***
2. Without using mathematical tables or calculator, evaluate 

***(04marks)***

1. The scale of a map is 1:500,000. What area in km2 does 6cm2 on the map represent?
2. Given the column vector, **p** = , **q** = and **r** = that . Express **a** as a column vector and hence calculate its magnitude. ***(04marks)***
3. Solve for in the equation. . ***(04marks)***

6. Given that **P** =  and **Q** = . Find matrix **R** such that **P**2 = **PQ** – **R**.

***(04marks)***

7. In the figure PQ is parallel to RS and the lines PS and RQ meet at T. Given that PT:TS = 2:3

and that RQ = 10cm. Find RT. ***(04marks)***

R

S

Q

P

2

3

T

3

8. Charo deposited shs 50,000 on a fixed deposit account for a period of three years. The bank pays

compound interest at the rate of 12% on half yearly basis. Calculate the total interest

Charo’s investment earned in that period. ***(04marks)***

9. A line whose gradient is 3 is perpendicular to another line passing through the point

(2,1). Find the equation of the line. ***(04marks)***

10. Given that  and . Find the value of  for which 

***(04marks)***

**SECTION B (60MARKS)**

*Attempt at most* ***five*** *questions from this section.*

11. Faces of 36 small wooden cubes are to be painted either green or black or white. Of

these 10cubes have all their faces painted green and 6 have all their faces painted black.

There are 5cubes with green and white, 8 white and black and 4 green and black. Cubes

with all faces painted white are three more than those with all faces painted black.

Given that G represents the set of cubes with at least a green face. W represents that of

cubes with at least a white and B represents the cubes with at least a black face.

a) Represent the above information on a Venn diagram, showing the remaining

information. ***(04marks)***

b) Find the number of cubes with:

(i) all the three different colour faces. ***(02marks)***

(ii) at least two of each of the three colour faces. ***(02marks)***

c) If a cube is picked at random, what is the probability that it is black or white only?

***(02marks)***

The diagram shows triangle OPQ in which QN : NP = 1 : 2, OT : TN = 3 : 2 and M is the mid-point of OQ.

N

Q

M

O

P

T

12.

a) Given that **OP**=**p** and **OQ** = **q**. express the following vectors in terms of **p** and **q**

(i)  (ii)  (iii)  ***(06marks)***

b) Show that P,T and M are collinear and hence determine the ratio PT:TM. ***(05marks)***

The figure shows a right pyramid VPQRS which stands on a rectangular base PQRS side PQ = 12cm, QR = 9cm, and each slant height of the pyramid is 20cm long.

O

S

N

V

M

P

Q

R

13.

a) Calculate to 4 significant figures the:

(i) height of the pyramid; ***(04marks)***

(ii) volume of the pyramid. ***(02marks)***

b) M and N are the mid-points of PQ and RS respectively. Calculate to 2 decimal places:

(i) the length of the line VM; ***(02marks)***

(ii) the size of the angle between the planes VPQ and PQRS; ***(02marks)***

(iii) the size of the angle VPQ and VRS. ***(02marks)***

14. Kavisha bought a piece of land at shs 50,000 per 100m2 and fenced it. The land is in the

shape of a rectangle measuring 180m by 150m. Kavisha bought fencing posts at shs 70

each and fencing wire at shs 800 per bale. The fencing posts were spaces 3m a part and

the fence is of 5 lines of wire to be complete. Each bale of fencing wire is 400m long.

Calculate the total amount of money Kavisha spent on buying the land and fencing

materials. ***(12marks)***

15. Kalome, a senior sales man is paid no commission on the first shs 30,000 worth of

goods he sells each month. He receives a commission at the rate of 3 ½% for the goods

sold up to shs 70,000 and at 5% on anything above that. Kalome is also paid a basic

salary of shs 4,040 and a house allowance of shs 1500 per month. At the end of March

his gross income was shs 8,665 while at the end of April he received a commission of

shs 4,100.

Determine the value of goods sold each month.  ***(12marks)***

16. Two friends John and James live 40km apart. One morning John left his house at 9:00am

and cycled towards James house at an average speed of 20km/hr. James left his house

at 10:30am on the same day and cycled towards John’s house at an average speed of

30km/hr. They rested for fifteen minutes and cycled to James’ home at an average

speed of 18kmh-1. Determine the:

a) distance from John’s house where the two friends met. ***(06marks)***

b) time of day when the two friends met. ***(06marks)***

c) time of day they arrived at James house. ***(06marks)***



17. Without using a calculator or mathematical tables, simplify:

2 ½ ÷ 4 - 2 ¼ ***(04marks)***

4

b) Given that  and 

(i) Determine . Hence evaluate  ***(04marks)***

(ii) Determine and the value of  for which  ***(04marks)***

***End -***