**NAME** ……………………………………………………**INDEX. NO.** ……………

**CLASS**……………… **CANDIDATES SIGN**……………………......……….

**DATE**…………………………………………………….

**121/1**

**FORM FOUR**

**MATHEMATICS PAPER1**

**JULY/AUGUST 2019**

**TIME: 21/2 HOURS**

**END-TERM 2 EVALUATION TEST 2019**

**MATHEMATICS PAPER 1**

**INSTRUCTIONS:**

1. This paper consist of two sections 1 and II.
2. Answer all the questions in section 1 and only five questions from section II
3. Non programmable calculator and Mathematical table may be used where necessary
4. Show all the steps in your calculation, giving your answers at each stage in the space provided.

**FOR EXAMINER’S USE ONLY:**

**SECTION I**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **TOTAL** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| **Grand** |  |
| **Total** |  |

**SECTION II**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **TOTAL** |
|  |  |  |  |  |  |  |  |  |

**Answer all the questions in section I**

**SECTION I (50MKS)**

1. Use logarithm table to evaluate (4mks)

2. Simplify (x +3)2 + (3x − 1)2 (3mks)

x2 +1

3. Three automatic electric bells A B and C ring at intervals of 20 minutes, 30

minutes and 50 minutes respectively. If the bells ring together at 8.20 am, at

what time will they ring simultaneously again for the first time . (3mks)

4. Given that 35x −2y=243 and 32x−y=3, calculate the values of x and y. (3mks)

5. The mean of the numbers m, 8m + 1, 17 and 20 is 14. Calculate the value of m.

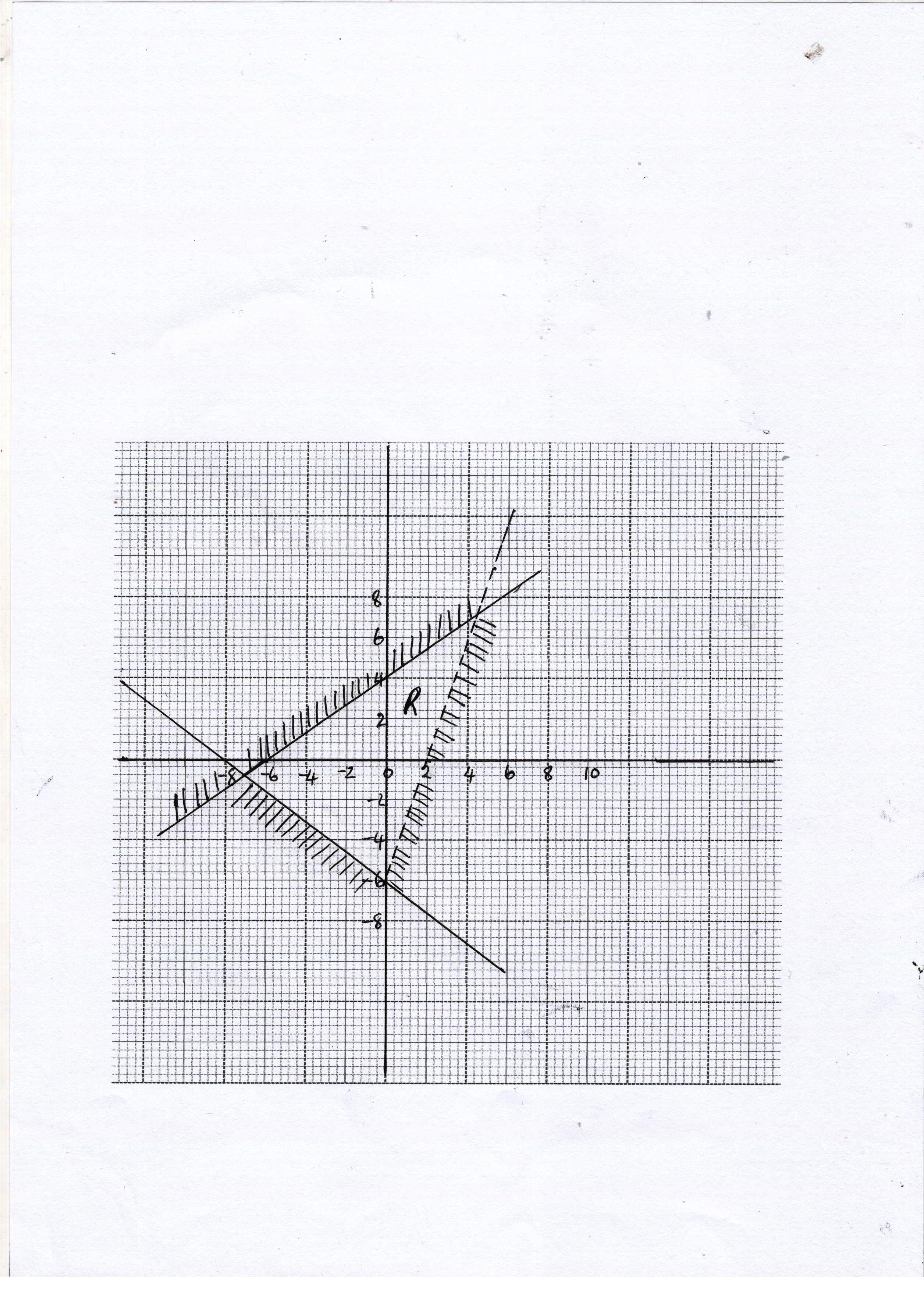
(2mks)

6. The area of a rhombus is 49cm2and each side is 10cm long. Calculate the acute

angle of the rhombus. (give your answer to 1 d.p) (3mks)

7. Determine the inequalities that define the unshaded region in the diagram

below. (3mks)



8. Use the table of reciprocals and squares to find (3mks)

+ 0.78262

9. A line with a gradient of − passes through the points (t,−5) and (3, t).

(a) Find the value of t. (2mks)

(b) Express the equation of the line in the form ax +by=c where a, b and c are

constants. (2mks)

10. Solve the following simultaneous equations (3mks)

x + y=3

6y −xy=70

11. Given that Sin(x +200)=−0.6776 find x, for 00 ≤ x ≤ 3600 (3mks)

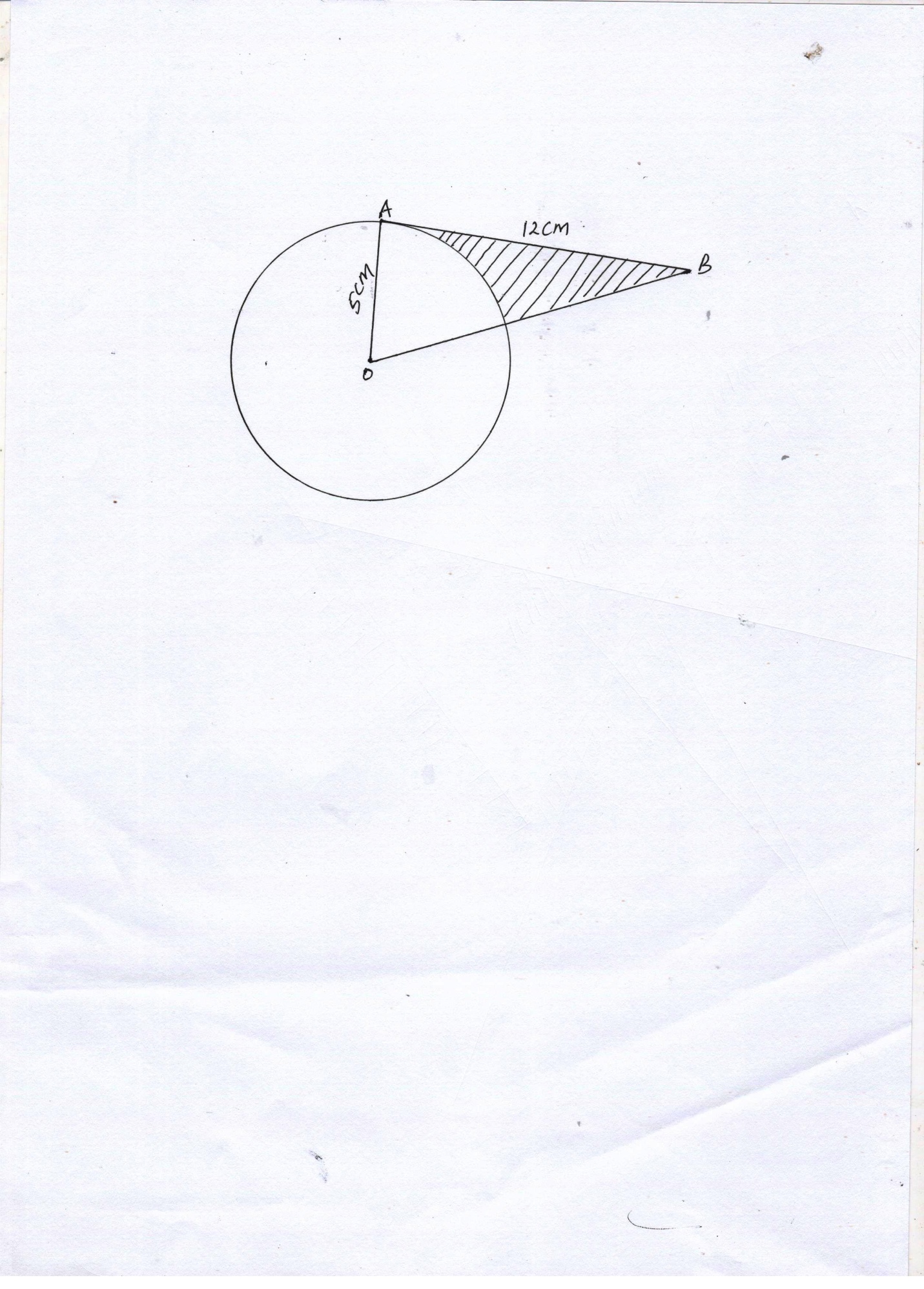
12. The interior angle of a regular polygon is 9 time its exterior angle. Find the

number of sides of the polygon. (3mks)

13. The diagram below show a circle centre O and the radius OA=5cm. Line AB is

a tangent of the circle at A and its length is 12cm. Find the area of the shaded

region. (3mks)



14. The position vectors of P,Q and R are **OP**= **OQ**= and **OR**=

Show that P, Q and R are collinear. (4mks)

15. Njoki earns a basic salary of sh11,800 per month. She is also paid commissions

as follow:

Commissions

For sales up to sh100,000 0%

For sales above sh.100,000

(i) For the first sh50,000 2.5%

(ii) For the next sh50,000 3.5%

For amount above sh200,000 5%

In a certain month, she sold goods worth sh.328,000. Find her total earnings

that month. (4mks)

16. Given that log 5=0.6990 and log7=0.8451, find log 24.5 (3mks)

**SECTION II(50MKS ) Answer any five questions only.**

17. The figure below shows a circle of radius 8cm centre O. B is a point on the

circumference such that <ABE=700

D

O

8cm

E

F C

70º

B

A

(a) Find the size of

(i) <CDE (2mks)

(ii) <ECO (2mks)

(b) Calculate the length of OF (2mks)

(c) Find the area of the major segment EDC. (2mks)

18. (a) Find the inverse of the matrix (2mks)

(b) A transport company has two types of vehicles for hire: Lorries and buses.

The vehicle are hired per day. The cost of hiring two lorries and five buses

is sh.156,000 and that of hiring 4 lorries and three buses is sh.137,000.

(i) Form two equations to represent the above information (2mks)

(ii) Use matrix method to determine the cost of hiring a lorry and that of

hiring a bus. (3mks)

(c) Find the value of x given that 2x −1 1 is a singular matrix (3mks)

x2 1

19. The diagram below shows a frustum which represents a bucket with an open

end diameter of 36cm and a bottom diameter of 24cm. The bucket is 30cm

deep as shown and it is used to fill an empty cylindrical tank of diameter 1.4m

and height 1.2m.

30cm

24cm

(a) leaving in your answer , calculate

(i) The capacity of the bucket in litres. (6mks)

(ii) The capacity of tank in litre. (2mks)

(b) Determine the number of buckets that must be drawn in order to fill the

tank. (2mks)

20. Given that the column vectors

**p**=, **q**=, **r**= and that **a** =2**p** − **q** + **r**

Express **a** as column vector and hence calculate its magnitude. (4mks)

(b) Given that the midpoints of PQ is (−3,1) and Q(7,5), obtain the

co−ordinates of P. (3mks)

(c) A translation T, maps triangle ABC onto triangle A′B′C′. Given the

co–ordinates A(2,3), B(2,5) and C(4,4). Find the co-ordinates of A′B′C′.

(3mks)

21. The distance S meters from a fixed point O, covered by a particle after t seconds

B given by the equation S=t3 − 6t2 + 9t +5

(a) Calculate the gradient of the curve at t=0.5 seconds (3mks)

(b) Determine the values of Sat the turning points of the curve. (3mks)

(c) Sketch the curve in the space provided. (4mks)

22. (a) Using a ruler and a pair of compasses only, construct triangle ABC in which

BC=6cm, AB=8.8cm and <ABC=220 (4mks)

(b) Measure AC and <ACB (2mks)

(c) Construct a circle that passes through A, B and C (3mks)

(c) What is the radius of this circle. (1mk)

23. A bus left town A at 11.45 am and travelled towards town B at an average

speed of 60km/h. A matatu left town B at 1.15pm and travelled towards town A

along the same road at an average speed of 90km/h. The distance between the

two town is 540km.

Determine :

(a) The time of day when the two vehicle met. (4mks)

(b) How far from town A they met? (2mks)

(c) How far outside town B the bus was when the matatu reached town A.

(4mks)

24. A triangle ABC has vertices A(3,4), B(1,3) and C(2,1).

(a) Draw triangle A′B′C′ the image of triangle ABC under a rotation of

+900about (0,0). (2mks)

(b) Draw triangle A′′B′′C′′ the image of triangle A′B′C′under a reflection in the

line y=x (2mks)

(c) Draw triangle A′′′B′′′C′′′the image of A′′B′′C′′under a rotation of −900 about

(0,0). (2mks)

(d) Describe single transformation that maps triangle ABC onto triangle

A′′′B′′′C′′′. (2mks)

(e) Write down the equations of the lines of symmetry of the quadrilateral

BB′′A′′A′ (2mks)