**MATHEMATICS**

**TERM 3**

**2023**

**NAME: …………………………………………………ADM NO……………….**

**CLASS……………….. DATE…………………**

**FORM TWO**

**MATHEMATICS**

**TIME: 2 ½ HOURS**

**Instructions**

1. **Write your name, adm no. class and date in the spaces provided above.**
2. **The paper consists of two sections: *section I* and *section II*.**
3. **Answer all the questions in section I and any five in section II**
4. **Section I has sixteen questions and section II has eight questions**
5. **All answers and working must be written on the question paper in the spaces provided below each question.**
6. **Show all the steps in your calculations, giving your answers at each stage in**

**the spaces below each question**

1. **KNEC Mathematical table and silent non-programmable calculators**

**may be used.**

**FOR EXAMINER’S USE ONLY**

**SECTION I**

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

**SECTION II**

**GRAND TOTAL**

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

***This paper consists of 14 printed pages***

**SECTION 1 (50 MARKS)**

***Answer any FIVE questions in this section in the spaces provided***

**1.**Evaluate: + ****  (3mks)

of ( +)

2.Express as a fraction. (2mks )

0.

3.Simplify (3mks)

4. Fifteen tractors each working eight hours a day take eight days to plough a piece of land. How long would it take 24 tractors each working 10 hours a day to plough the same piece of land 3mks)

5. The shaded region below shows the area swept out on a flat windscreen by a wiper. Calculate the area of the shaded region. (4mks)

4cm

16cm 120o

6.The mass of two bags of beans and three bags of salt is 410kg. If the mass of three bags of beans and two bags of salt is 390kg, find the mass of each bag. (3mks)

7.The interior angle of a regular polygon is twice the exterior angle.

1. Find the number of sides of the polygon. (3mks)
2. What is the name of the polygon? (1mks)

8. The angle of elevation of a church tower from a point A, 50 metres away from the foot of the church is 24o. Find the distance between A and B if the angle of elevation of the tower from B is 20o. (4mks)

9.The figure below is a cross section of a swimming pool 8m wide. Calculate the capacity of the pool in litres. (3mks)

30m

1m

3m

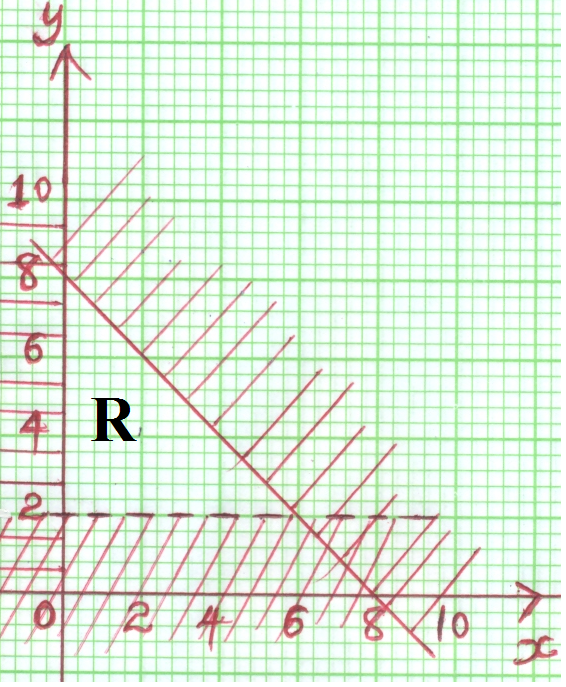
10. Three litres of water (density 1g/cm³) is added to twelve litres of alcohol (density 0.8/cm³).What is the density of the mixture? (3mks)

11. The volume of two similar solid spheres are 4752cm³ and 1408cm³. If the surface area of the small sphere is 352cm², find the surface area of the larger sphere. (3mks)

12. Solve for x in the equation = 32 (3mks)

13. Momanyi spent one eight of his February Salary on farming, half on school fees and two thirds of the remainder on food. Calculate his February salary and the amount he spend on school fees if he spent sh. 3200 on food. (3marks)

14. Form three inequalities that satisfy the unshaded region R. (3marks)



15. A Kenyan tourist in US borrowed 10,000 US dollars to pay for his son’s examination.

He is expected to pay either in Kenyan shillings or through an account in the United Kingdom in

sterling pounds. If he decided to pay through United Kingdom, how much would he save given

that

1 US dollar = 82.4 Kenyan shillings

1 Sterling pound = 1.4 US dollar

1 Sterling pound = 105 Kenyan shillings (3mks)

16. Solve for X in the equation. (3mks)



**SECTION II (50MKS)**

***Answer any FIVE questions in this section in the spaces provided***

17. The figure below shows a glass in form of a frustrum of a cone whose top and bottom diameter of 7cm and 3.5cm respectively. Its depth is 10cm. Taking ,



Calculate;

a) Its total surface area. (5 marks)

b). Its capacity in litres. (5 marks)

18.Two friends Jane and Tom live 40km apart. One day Jane left her house at 9.00am and cycled towards Tom’s house at an average speed of 15km/hr. Tom left at 10.30am on the same day and cycled towards Jane’s house at an average speed of 25km/hr.

1. Determine;
2. The distance from Jane’s house, where the two friends met. (4 marks)
3. The time they met. (2 marks)
4. How far Jane was from Tom’s house when they met? (2 marks)
5. The two friends took 10 minutes at the meeting point and they cycled to Tom’s house at an average speed of 12km/hr. Find the time they arrived at Tom’s house. (2 marks)

19. Town Q is 180km on bearing of 050o from town P. Another town R is on a bearing 110o from P and also on compass bearing S 30oE from Q. Town S is South of P and also West of R.

Using scale 1 cm rep. 20 km;

1. Draw the scale diagram to show the positions of the four towns. (6 marks)
2. Use your scale diagram in (a) above to find;
3. The distance of R from P. (1 mark)
4. The bearing of Q from S. (1 mark)
5. The distance of Q from S. (1 mark)
6. How far P is North of S. (1 mark)

20. The mark of 100 candidates for mathematics examination were distributed as follows.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| marks | No of candidates(f) | Mid-point(x) | fx | c.f |
| 30-34  35-39  40-44  45-49  50-54  55-59  60-64 | 5  24  26  24  13  6  2 |  |  |  |

(a)Calculate

(i) The mean mark (2mks)

(ii) The median (3mks)

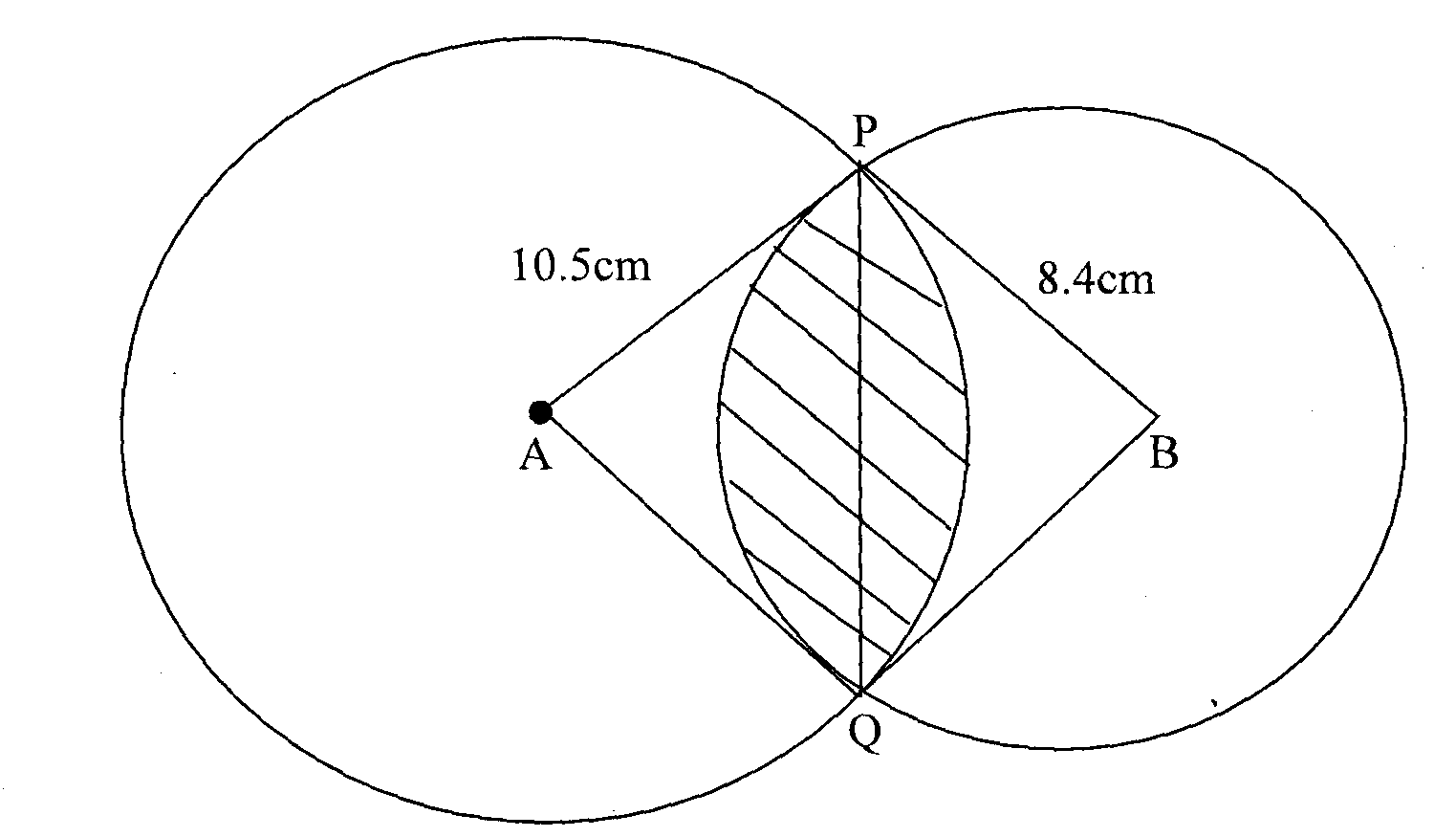
(b) On the grid provided, draw a histogram. (3mks)



(c) On the same graph, draw a frequency polygon. (1mk)

(d) Find the modal mark. (1mk)

21. The figure below shows two circles of radii 10.5 and 8.4cm and with centres A and B respectively. The common chord PQ is 9cm.



(a) Calculate angle PAQ. (2 mks)

(b) Calculate angle PBQ. (2 mks)

(c) Calculate the area of the shaded part. (6 mks)

22. Three business partners; Kamau, Tatwa and Makau contributed Ksh. 100,000, Ksh. 80,000 and Ksh. 50,000 respectively to start a business. After one year, the business realized a profit which they shared in the ratio of their contributions.

* 1. If Makau’s share of profit was Kshs. 20,000, how much was the total amount of profit?

(3mks)

* 1. At the beginning of the second year, Makau boosted his shares by Ksh. 10,000. If the business profit increased by 20% at the end of the second year, calculate:-
     1. Kamau’s share of the profit. (4mks)
     2. The difference between Kamau’s and Tatwa’s share of profit. (3mks)

23. (a) Show by shading the unwanted region, the region which satisfies the following inequalities (8mks)

Y > -3

4y ≤5x + 20

2y < - 5 x + 10

4y≤ -3x – 12



(b) Calculate the area of this region in a square units (2mks)

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

(a) On the grid provided draw triangle ABC and its image A1B1C1 under a rotation of negative quarter turn about the point (0,0) (3 marks)

(b) (i) Draw triangle A11B11C11 the image of A1B1C1 under a reflection in the line y = -x (2 marks)

(ii) Describe fully the transformation that maps A11B11C11 onto ABC (2 marks)

(c) (i) On the same axes draw triangle A111B111C111  the image of A11B11C11 under a translation given by translation Vector

(iii) State the co ordinates of A111B111C111 (2 marks)

