121/1
MATHEMATICS

SECTION I (50 marks)
(Answer all questions in this section)

1. Evaluate without using mathematical tables or the calculator. 3mks*TRZ*
$$\frac{0.38 \times 0.23 \times 2.7}{0.114 \times 0.0575}$$

2. Use reciprocal tables only to find the value of $\frac{1}{0.325}$ 1mk*TRZ*

Hence evaluate 2mks*TRZ*
$$\sqrt[3]{\frac{0.000512}{0.325}}$$

3. Solve for x in $\frac{6x-4}{3} - \frac{2x-1}{2} = \frac{6-5x}{6}$ 2mks*TRZ*

4. A business woman bought 288 bananas at sh. 10 for every 12. She sold all of them at sh. 20 for every 18. What was her percentage profit. 4mks*TRZ*

5. Find the equation of the perpendicular bisector of the line AB where the co-ordinates of A and B are (-2,4) and (4,-2) respectively. 3mks*TRZ*

6. If 2/3 is added to the numerator of a certain fraction, the fraction will be increased by 1/21 and if ½ is taken from its denominator the fraction becomes 2/9. Find the reciprocal of the fraction. 4mks*TRZ*

7. A solid sphere radius 10cm weighs 3kg. Calculate the weight in kg of a solid sphere, radius 30cm if they are made of the same material. 3mks*TRZ*

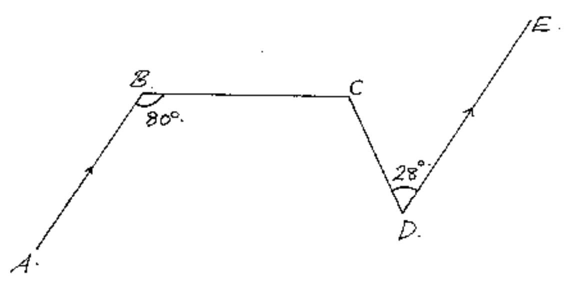
8. Give the integral values of x which satisfy the following inequalities.
$4 < 3x - 2$
$15 - 2x > 4$ 3mks*TRZ*

9. Find the mean of 0.002, 0.004, 0.005, 0.006, 0.008 given that the mean of 20, 40, 50 , 60 and 80 is 50. 2mks*TRZ*

10. One litre of melted metal is cast into 15 equal cubes. The volume of the metal is reduced by 4% on cooling. Calculate the dimensions of the cube in cm. 3mks*TRZ*

11. Solve the simultaneous equation below
$\text{Log}_3\, 2x + y = 2$
$\text{Log}_2\, 5x + 2y = 4$ 4mks*TRZ*

12



In the figure above, AB is parallel to DE; $\angle ABC = 80^0$ and $\angle CDE = 28^0$. Find $\angle DCB$. 2mks*TRZ*

13. The GCD and LCM of three number are 3 and 1008 respectively. If two of the numbers are 48 and 72, find the least possible value of the third number. 2mks*TRZ*

14. Simplify the following expression and them factorise completely. 3mks*TRZ*
$$6q^2 - 11q - 6 - (2q-3)^2$$

15. A bus leaves a town Q at 6.30a.m. and travels towards R, 400km away at an average speed of 80km/hr. At 8.00a.m a truck left R for Q at an average speed of 60km/hr. At what time will the two vehicles meet and how far from Q is the meeting point. 4mks*TRZ*

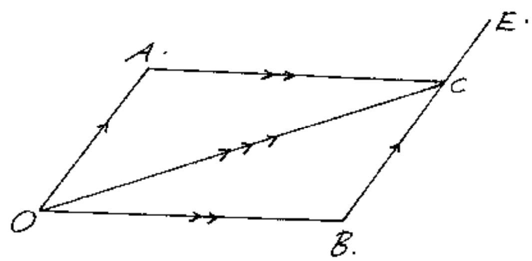
16. Measurement of a maize field using a base line XY = 240m were recorded as shown below. (Measurement in metres).

		Y		
TO R	60	190		
		150	50	to p
To Q	60	120		
To T	30	50	20	to M
		X		

a) Use a suitable scale to draw the map of the maize field. 2mks*TRZ*
b) Find the area of the field in hectares. 3mks*TRZ*

SECTION II (50 MARKS)
Answer any FIVE questions from this section

17. In the diagram below, OACB is a parallelogram. D is on AC such that AD:DC = 2:1 and that ½ BC = CE.



a) Given that **OA** = **a**, **OB** = **b** and **OC** = c express in term of **a** and **c** only.
(i) **OD** 2mks*TRZ*
(ii) **OE** 1mk*TRZ*
b) Given that ∠BOE = 26^0, OE = 5 units and OB = 3 units, calculate the length BE. 2mks*TRZ*

c) Given further that **a** = $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$, **b** = $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$ and **c** = $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$, find | 2**a** + ½ **b** – **c**|

2mks*TRZ*

d) Find the image of the point B(2,-17) under a translocation T = $\begin{pmatrix} -10 \\ 5 \end{pmatrix}$ 2mks*TRZ*

18. a) Using a ruler and compasses only, construct triangle ABC such that AB = 4cm, BC = 5cm and ∠ABC = 120^0. Measure AC. 3mks*TRZ*

b) On the same diagram, construct a circle which passes through the vertices of the triangle ABC. Measure the radius of the circle. 4mks*TRZ*

c) Measure the shortest distance from the centre of the circle to the line BC.1mk2mks

d) With BC as the base, calculate the area of the triangle ABC. 2mks*TRZ*

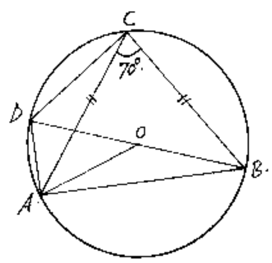
19. A printer wishes to import a printing machine into Kenya, direct from the manufacturer in East Germany. The ex-factory price of the machine is 32075DM. Shipping and insurance charges amount to 1,450 DM. On arrival in Kenya, the machine is subjected to customs duty at the rate of 30% of the machine plus shipping and the insurance cost. The price is further increased by a sales tax charged at the rate of 15% of the price including customs duty.

a) Calculate the customs duty. 3mks*TRZ*

b) Calculate the sales tax. 3mks*TRZ*
c) Calculate the total cost of the machine in Kenya shillings given that 1DM = Ksh 10.4 giving your answer to the nearest hundred shillings. 4mks*TRZ*

20. Four towns R,T,K and G are such that T is 84km directly to the north of R and K is on a bearing of 295^0 from R at a distance of 60km. G is on a bearing of 340^0 from K and at a distance of 30km. Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative positions of the towns. 4mks*TRZ*
Find
(a) The distance and the bearing of T from K. 2mks*TRZ*
(b) The distance and the bearing of G from T. 2mks*TRZ*
(c) The bearing of R from G and the distance between them. 2mks*TRZ*

21. The figure below shows a circle centre O and a cyclic quadrilateral ABCD. AC = CB. Angle ACB = 70^0 and BOD is straight line. Giving reasons for your answer, find the size of the angles below.



a) angle ACD 2mks*TRZ*
b) angle AOB 2mks*TRZ*
c) angle CAD 2mks*TRZ*
d) angle ADC 2mks*TRZ*
e) angle AOD 2mks*TRZ*

22. a) On the grid provided, plot the triangle whose co-ordinates are A(1,2), B(5,4) C(2,6). 1mk*TRZ*

On the same grid,
b) (i) Draw the image $A^1B^1C^1$ of ABC under a rotation of 90^0 clockwise about the origin.

2mks*TRZ*
(ii) Draw the image of $A^1B^1C^1$ under a reflection in line y=-x. State the co-ordinates of $A^{11}B^{11}C^{11}$. 3mks*TRZ*
c) $A^{111}B^{111}C^{111}$ is the image of $A^{11}B^{11}C^{11}$ under the reflection in the line x=0. Draw the image $A^{111}B^{111}C^{111}$ and state its co-ordinates. 2mks*TRZ*
d) Describe a single transformation that maps $A^{111}B^{111}C^{111}$ onto ABCD. 2mks*TRZ*

23. The number of visitors per day to a game park was recorded over a period of 60 days. The figures are shown in the table below.

No. of visitors	0-19	20-39	40-59	60-69	70-79	80-99	100-119	120-139
No of days	2	6	16	0	10	Y	12	6

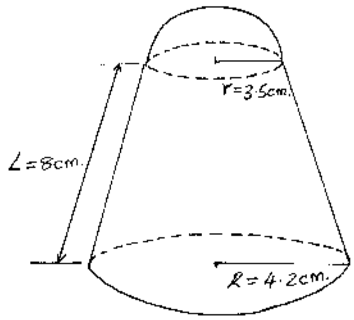
a) Find the value of y. 2mks*TRZ*

b) State the modal class. 1mk*TRZ*

c) State the midpoints of each class. 2mks*TRZ*

d) Draw a histogram hence a frequency polygon for these figures on the same axes. 5mks*TRZ*

24. A solid is made up of a conical frustrum and a hemispherical top as shown in the figure below. The dimensions are as indicated in the figure below.



a) Find the area of

(i) The circular base 2mks*TRZ*

(ii) The curved surface of the frustum 3mks*TRZ*

(iii) The hemispherical surface 2mks*TRZ*

b) A similar solid has a total surface area of $81.51 cm^2$. Determine the radius of its base. 3mks*TRZ*