**SECTION I (50MARKS)**

***Answer all questions in this section***

1. Use mathematical tables to evaluate (4marks)

 Cos 57 .60 × 12 .14

 Log 8 ÷ 21 .55

1. P varies directly as the square of Q and inversely as the square root of R. Find the percentage change in P if Q is increased in the ratio 5:4 and R decreased in the ratio 4:9 (3marks)
2. Solve for x in (2marks)

 Log 3(x - 8) – log 3 (x + 1) = 1

1. The height and the radius of a cone are measured as 21cm and 14 .0cm respectively. Taking л = 3 .142, find the percentage error in the volume of the cone. (3marks)
2. Find the value which is independent of x in the expansion (3marks)
3. Six interior angles of a hexagon form an arithmetic progression. If the largest angle is 1500, find the size of the smallest angle (3marks)
4. Use matrix method to solve this set if simultaneous equations (4marks)

 3p – 4q = 2

 5p + 3q = 13

1. Make m the subject of the formula (3marks)
2. The value of a water pump when it is new is sh. 78 850. If its value after three years is sh. 57 480, find the rate of depreciation. (3marks)
3. Given that **a** = 2**i** + 3**j** – 5**k** and **b** = **i**– 5**j** + 7**k**, calculate |2**a** + **b**| (3marks)
4. Simplify (3marks)

 10 10

 2√3 - √7 2√3 + √7

1. The image of point Q (1 ,2) after a translation is QI (-1 ,2). What are the coordinates of a point R whose image RI is (-3, -3) after this translation? (2marks)
2. State the integral values which satisfy the inequalities shown and represent it on a number line (4marks)

 2x + 5 > x + 9 < 21 – x

1. Solve for x in the equation (3marks)

 125-x × 52(x - 1) = 25(x + 2)

1. In the diagram below x is a point of intersection of the chords AC and BD of the circle such that AX = 8cm, XC = 4cm and XD = 6cm
2. Find the length of XB (2marks)
3. Given that the area of triangle AXD is 6cm2, find the area of the triangle BXC (2marks)
4. Simplify (3marks)

 4t2 + 12tp + 5p2

 4t2 – p2

**SECTION II (50MARKS)**

*Answer* ***only five*** *questions in this section in the spaces provided*

1. A retailer bought some rice at whole sale price of sh. 35 per Kg. He packed three quarters of the rice in 2Kg packets and sold each packet at sh. 80. He packed the remaining one quarter in 1Kg packets and sold each packet at sh.42. After selling the rice, he found that he had made a profit of sh. 1320
2. Determine the amount of rice he bought. (5marks)
3. Calculate to 1 decimal place;
4. The percentage profit he made (2marks)
5. The percentage profit he would have made if he sold all the rice in 2Kg packets. (3marks)
6. Bag A has 4 mangoes and 5 lemons. Bag B has 5 mangoes and 3 lemons. A bag is selected at random and 2 fruits picked at a time without replacement. Represent the above information in a tree diagram (2marks)

Use your diagram to find the probability that;

1. The two fruits were sweet and from bag A (2marks)
2. The two fruits were bitter (3marks)
3. At most one fruit was sweet (3marks)
4. Two variables s and r are related by the equation s = kBr where k and B are constants.
5. Determine the quantities which should be plotted against each other so as to give a straight line. (2marks)
6. Some students performed an experiment in the laboratory to verify the above equation. The obtained the following results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| s | 48 .8 | 65 .0 | 72 .8 | 89 .0 | 108 .8 | 132 .8 |
| r | 0.4 | 0.8 | 1 .2 | 1 .6 | 2 .0 | 2 .4 |

1. Draw a straight line to verify the law (5marks)
2. From the graph, the students realized that one reading was mis recorded. Identify the mis-recorded reading. (1mark)
3. From your graph find the value of B (2marks)
4. The table below shows the age groups of people who are left handed in a given country

|  |  |
| --- | --- |
| Age group | No. of people |
| 10 -19 | 12 |
| 20 -29 | 15 |
| 30 - 39 | 16 |
| 40 - 49 | 25 |
| 50 -59 | 18 |
| 60 - 69 | 10 |
| 70 -79 | 4 |

1. State the modal age group (1mark)
2. Using calculation, estimate the median age group (4marks)
3. Calculate the mean age of the left handed persons (5marks)
4. A triangle has vertices A(-4, -1), B(-1, -3) and C(-2, -1)
5. Draw triangle ABC on the Cartesian plane. (1mark)
6. Construct the image triangle AIBICI of triangle ABC under a reflection in the line y = -x (3marks)
7. Construct the image triangle AIIBIICII of triangle AIBICI under a rotation of 900 clockwise about the origin (3marks)
8. Construct the image triangle AIIIBIIICIII of triangle AIIBIICII under enlargement scale factor -2 centre (-1, 0) (3marks)
9. Four towns P, Q, R and S are such that town Q is 120km due East of town P. Town R is 160km due North of town Q, town S is on a bearing of 3300 from P and on a bearing of 3000 from R.
10. Using a ruler and a pair of compasses only show the positions of towns P, Q, R and S (take a scale of 1cm = 50km) (5marks)
11. Determine
12. The distance SQ
13. The distance SR
14. The bearing of town S from town Q (5marks)
15. The area Acm2 of a cylinder depends partly on r and partly on r2 where r is the radius of the base. When r = 1cm, A= 7cm2 and when r =2cm, A= 16cm2.
16. Find an expression for A in terms of r (4marks)
17. Calculate the radius when the area is 115cm2. Give your answer to 1 decimal place (4marks)
18. Find the value of r for which the two parts are equal (2marks)
19. Two pulleys of radii 21cm and 10 .5cm have their centres A and B 40cm apart. A tight rope runs all around the pulleys as shown in the diagram below.

Calculate;

1. The length of the belt in contact with the pulley center B (4marks)
2. The length of the belt in contact with the pulley centre A (3marks)
3. The total length of the belt (3marks)