**Name…………………………………………………………………. Index Number……………….**

**Time: 2 ½ hours**

**KAHUHO UHURU HIGH SCHOOL**

**PRE MOCK EXAMINATION TERM 1 2012**

**MATHEMATICS PP2**

Instructions to candidates

1. *Write your name and index number in the spaces provided above*
2. *This paper consists of* ***TWO*** *sections:* ***Section I*** *and* ***Section II.***
3. *Answer* ***ALL*** *the questions in* ***Section I*** *and only* ***five*** *questions from* ***Section II.***
4. *All answers and working must be written on the question paper in the spaces provided below each question*
5. ***Show all the steps in your calculations, giving your answer at each stage in the spaces below******each question***
6. *Marks may be given for correct working even if the answer is wrong*
7. ***Non programmable*** *silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise*
8. ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing***

**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**

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

**Grand total**

|  |
| --- |
|  |

**SECTION I (50MARKS)**

***Answer all the questions in this section in the spaces provided***

1. Use logarithm tables to evaluate (4marks)

 38 . 32 × 12 .964

 86 .37 × 6 .285

1. Find the equation of the line passing through (-5, 2) and with the x-intercept as 3. Leave your answer in the form of y = mx + c (3marks)
2. Make d the subject of the formula given that (3marks)

 1 + d2 b

 B2 3

1. Z varies jointly as the square of x and inversely as the square of y. When x = 10 and y = 4 then z = 15.
2. Find Z in terms of x and y (2marks)
3. Find the value of x when z = 8 and y = 12 (1mark)
4. Given the following find the values of a and b where a and b are rational numbers. (3marks)

 2 + √5 3 + √5 = a + b√5

 2 - √5 2 + √5

1. Find the length PR in a triangle PQR having PQ = 12cm, QR = 8 .4cm angle QPR = 350 and angle PRQ = 750 leaving your answer correct to 2 decimal places. (2marks)
2. Expand and simplify the following binomial expression (2 - x)6 up to the term in x2 (1mark)

 Use your expansion up to the term in x2 to estimate (1 .99)6 (2marks)

1. Solve the logarithmic equation log10(6x - 2) – 1 = log10(x - 3) (3marks)
2. What would Ksh.15000 amount to after 3 years at 16% p.a compounded quarterly? (3marks)
3. The first and second terms of an arithmetic sequence add up to 10 and the sum of the first 10 terms is 210. Find the seventh term of this sequence. (4marks)
4. Given that x = 2**i** + **j** – 2**k**, y = -3**i** + 4**j** –**k** and z = -5**i** + 3**j** + 2**k** and that p = 3x – y + 2z. Calculate the magnitude of p correct to 3 significant figures.(3marks)
5. Given that P = 2 3 and Q = 2 -3 find PQ

 1 2 -1 2

Hence solve the simultaneous equations below

 2x – 3y = 5

 -x + 2y = -3 (3marks)

 13. The figure below shows a circle. AB and PQ are chords intersecting externally at a point C. AB = 9cm, PQ = 5cm and QC = 4cm, find the value of x (3marks)

14. Solve the equation 4cos2θ + 3sinθ =4 where 00 ≤ θ ≤ 3600 (4marks)

15. Find the radius and the coordinates of the centre of a circle whose equation is given by

 6y2 -9x + 6x2 + 6y + 3/2 = 0 (3marks)

16. A liquid contain 98% sulphuric acid and the rest water. In what ratio must it be mixed with pure water to get a solution which is 70% sulphuric acid (3 marks)

**SECTION II (50MARKS)**

***Answer only five questions***

17. Seeds pods are collected and weighed, to the nearest gram. The frequency distribution is given below . calculate:

|  |  |
| --- | --- |
| mass | frequency |
| 10 -13 | 20 |
| 14 -17 | 25 |
| 18 -21 | 32 |
| 22 -25 | 48 |
| 26 -29 | 35 |
| 30 – 33 | 27 |
| 34 -37 | 23 |

1. The median (3marks)
2. Using assumed mean of 23.5, calculate;
3. The mean (4marks)
4. The standard deviation (3marks)

18. a) X, Y and Z are 3 bags. Bag X contains 2 blue balls and 3 red ones. Bag Y contains contains 3 blue balls and 4 red ones while bag Z contains 1 blue ball and 2 red balls. A bag is chosen at random and two balls are picked at random, one after the other and without replacement.

1. Draw a tree diagram to represent the above information. (3marks)
2. Hence determine the probability of getting two blue balls. (3marks)

b) During a certain motor rally, it is predicted that the weather will be either dry or wet. The probability that the weather will be dry is estimated to be 0.3. The probability that the driver will complete the rally during the wet weather is estimated to be ⅘. What is the probability that;

1. The weather was wet and the driver completes the journey? (2marks)
2. The driver completes the journey (2marks)

19. a) Complete the table below (2marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 00 | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 |
| 4cos2x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2sin(2x + 30) |  |  |  |  |  |  |  |  |  |  |  |  |  |

 b) On the grid provided draw on the same axes the graphs y 4cos 2x and y = 2sin (2x + 30) for 00 ≤ x ≤ 1800 (5marks)

 c) From your graph;

1. State the amplitude of y = 4cos2x (1mark)
2. Find the period of y = 2sin (2x + 30) (1mark)
3. Solve 4cos2x – 2sin (2x + 30) = 0 (1mark)

20. Water flows through a pipe of internal diameter 25 .2cm at the rate of 5m/second.

1. Taking π = 22/7, calculate the volume of water that flows through the pipe;
2. Per second in cm3 (2marks)
3. Per hour in litres (2marks)
4. The water flows into a cylindrical tank whose internal diameter and height are 14m and 21m respectively. How many hours does it take to fill the tank? (give your answer correct to 2 s.f) (3marks)
5. Mdoe, Kawira and Atieno divided some money in the ratio 4 : 6 : 9. Kawira got sh.700 more than Mdoe. How much did Kawira get? (3marks)

21. a)A certain carpenter was to make two types of chairs type A and type B to supply to a school. The total number of chairs must be more than 400. He had to supply more of type A than type B. However the number of type A chairs must not be more than 300 and the number of type B chairs must not be less than 80. Let x be the number of chairs of type A and y the number of chairs of type B. Write down all the inequalities in x and y representing the above information (3marks)

b) Draw the graphs of the inequalities above on the same axes (4marks)

c) the profits were as follows:

 type A sh.600 per chair

 type B sh.400 per chair

Use the graph to determine the number of chairs of each type that should be made to maximize the profit (2marks)

d) Calculate the maximum profit earned by the carpenter in Ksh. (1mark)

22. Using a scale of 1cm to represent 2 units on each axis

a) Mark the points O(0,0), A(6, -8) and B (16, 8) where the units are in Km. Find by construction the locus of P which is nearest B than A which is also not more than 14km from A. Mark points P1 and P2 which are 14km from A and also equidistant from A and B. Find the distance P1 and p2 (6marks)

b) Measure angle P1AP2 (1mark)

c) Hence calculate the area of the locus P (3marks)

23. Two points P and Q are found on the earth’s surface. The position of P is (520S, 660W) and Q (520S, 1140E) Using the earth’s radius = 6370km and π = 22/7.

1. Find the difference in longitude between points P and Q (1mark)
2. Calculate the shortest distance between points P and Q along
3. The latitude in km (to 1 whole number) (3marks)
4. The longitude in km (to 1 whole number) (3marks)
5. A plane travelling at 800kmh-1 leaves point P at 10.00a.m and sails through south pole to point Q. Find the local time the plane arrives at point Q to the nearest minute (3marks)

24. The given figure shows the net of a regular rectangular based pyramid. The rectangle measures 18cm by 15cm. N and K are mid points of AD and BC respectively. O is the centre of the rectangle ABCD.

1. Sketch the pyramid and label all the vertices. (1mark)
2. From the diagram in (a) above calculate to 2 decimal places
3. The length CV (2marks)
4. The length VO (2marks)
5. The angle between the plane VBC and the base ABCD (2marks)
6. The angle between the plane BVC and AVD (3marks)