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**University Examinations 2014/2015**

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN ELECTRICAL INSTALLATION.

**SMA 0021: MATHEMATICS III**

**DATE: DECEMBER 2014 TIME: 1HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. If a wooden bed is sold for shs. 12,000, it would be equivalent to 5% loss for the trader. At what price should he sell the bed to realize a profit of 25% (4 marks)
2. Convert 1350 to radians giving the answer in its simplest form in terms of

(3 marks)

1. Resolve the vector =(8,300)into horizontal and vertical components (4 marks)
2. Express the following angles in terms of trigonometric ratios of acute angles and then give the values
3. tan 2100 (2 marks)
4. cos 3150 (2 marks)
5. A business man left Kenya for Britain with kshs. 150,000 which he exchanged for sterling pounds at a rate of shs 110.539 per sterling pound. He spent a third of his money in Britain and then left to America where he exchanged the remaining pounds for Dollars at a rate of US$ 1.622 to sterling pound. Calculate how much he finally got in US Dollars. (5 marks)
6. Draw the graph of for the interval 000. Use the graph to solve the following (5 marks)
7. Two towns A and B lie on a straight line 20km apart, B being east of A. Town C is observed on a bearing of 1600 from A a distance of 30km. Find the distance of town C from B and the bearing of C from B (5 marks)

**QUESTION TWO (15 MARKS)**

1. Marete bought 18 trays of eggs at shs105 each. Each tray contains 30 eggs. But 27 eggs broke during transportation. At what price should he sell each egg in order to make a profit of 18% (5 marks)
2. The table below shows the income tax rates in a certain year.

Taxable income in k₤P.a Rate in each twenty shillings.

1-5808 10%

5809-11280 15%

11281-16752 20%

16753-22224 25%

Excess over 22224 30%

Mr. Kamau is a civil servant and earns a monthly basic salary of kshs. 20560, a house allowance of shs12,000, a medical allowance of shs 2240 and a commuter allowance of shs 840. He is entitled to a tax relief of shs 1162 per annum.

1. Calculate his taxable income p.a in k₤ (2 marks)
2. How much tax in kshs does he pay monthly 5 marks)
3. The following deductions are made on his salary

NHIF shs 320

Co-operative loan shs 410

Service charge shs 100

Calculate his net salary in kshs 3 marks)

**QUESTION THREE (15 MARKS)**

1. A test given to 40 students produced the following results

5 students got grade A

12 students got grade B

15 students got grade C

5 students got grade D

3 students got grade E

Represent the following information on a pie chart (5 marks)

1. In triangle PQR, p=12cm, r=10cm and angle P=300. Calculate the radius of the circumcircle of the triangle and the remaining angles and side of the triangle ( 6 marks)
2. Given that s= and is acute, find without using tables or calculators, the value of

**QUESTION FOUR (15 MARKS)**

1. Find the resultant of two forces of 7 Newtons and 3 Newtons, acting at a point and at right angles to each other (4 marks)
2. The table below shows the marks obtained by students in a maths examination.

|  |  |
| --- | --- |
| **Marks** | **No. of students** |
| 31-35  36-40  41-45  46-50  51-55  56-60 | 3  5  12  15  8  2 |

1. State the modal class (1 mark)
2. Determine the mean and median mark (6 marks)
3. Represent the data using a histogram (4 marks)

**QUESTION FIVE (15 MARKS)**

1. Draw the graph of for the range taking interval of 300. State the amplitude and the period (10 marks)
2. Bimax enterprises had the following trading results for the month of January 2013

Stock (1.1.2013) shs 5,000

Purchases shs 40,000

Sales shs 48,000

Closing stock (31.1.2013) shs 7,500

Carriage inwards shs 1,500

Returns outwards shs 2,500

Returns inwards shs 2,000

Calculate his gross profit for the month of January 2013 (5 marks)