JARAMOGI OGINGA ODINGA UNIVERSITY

OF SCIENCE & TECHNOLOGY

UNIVERSITY EXAMINATIONS 2012/2013

1ST YEAR 1ST SEMESTER EXAMINATION FOR THE DIPLOMA IN COMMUNITY HEALTH AND DEVELOPMENT

(BUSIA LEARNING CENTRE)

COURSE CODE: SMA 2111

COURSE TITLE: MATHEMATICS

DATE: 12/8/2013   **TIME: 2.00-3.30 PM**

DURATION: 1.30 HOURS

INSTRUCTIONS

1. This paper consists of TWO sections A and B.
2.   Answer Question 1 (Compulsory) and any other 2 questions.
3. Write your answers on the answer booklet provided.

SECTION A: ANSWER ALL QUESTIONS

1. Simplify;
$$\sqrt{50} + \sqrt{2} - 2\sqrt{18} + \sqrt{8}$$ (3 marks)

2. Rationalize:
$$\frac{2 + \sqrt{3}}{4 + \sqrt{5}}$$ (3 marks)

3. Show the following using the Venn diagrams.

       A n B   (1 mark)

       A u B   (1 mark)

       A – B   (1 mark)

   ii.   Given S = {a,b,c,d} and T = {f,b,d,g}. work out

        S u T   (2 marks)

4. Simplify:
$$\frac{(1 + x)^{1/2} - 1/2x\,(1 + x)^{-1/2}}{1 + x}$$
$$\frac{}{2}$$ (3 marks)

5a) Prove that:
$$\log_a X - \log_a Y = \log_a (x/y)$$ (3 marks)

  b) Solve
$$\log \frac{a^2 b^3}{100\ c}$$ (3 marks)

6. How many even numbers greater than 2000 can be formed with the digits 1,2,4,8……, if each digit can be used only once in each number. (3 marks)

7. Solve $5x^2 – 6x – 2 = 0$ by completing square method. (4 marks)

8. Five letter words are formed from letter of the word TIEGROUP. How many of these words have no repeated letters? (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

9. a) Proof De Molvres Theorem (8 marks)

   b) By using De Moivres theorem show that:

$$\tan 3\theta = \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$$

(12 marks)

10. Show that :

$$ax^2 \pm bx + c = 0 \text{ results into } x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}.$$

Where $a \neq$ (12 marks)

Hence solve:

$30x^2 + 49x + 20 = 0$ by the above formula. (8 marks)

11. The table below shows marks scored by 90 pupils in a mathematics test.

CLASS	5-9	10-14	15-19	20-24	25-29	30-34	35-39
	2	13	31	23	14	6	1

Find:

   i.   The mean
   ii. The median
   iii. The modal class (20 marks)

12. Obtain the first four terms of the expansion $(1 + 1/2x)^{10}$ in ascending powers of x. Hence find the value of $(1.005)^{10}$ correct to four decimal places. (8 marks)

13. Solve:

$3 \cos x - 4 \sin x = 2$ in the domain $0^o < x < 360^o$. (12 marks)