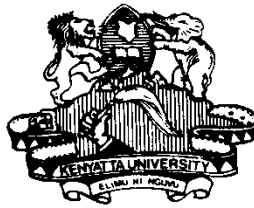




SMA1022011 0704 - For revision purposes

BUSINESS MANAGEMENT (Kenyatta University)



## KENYATTA UNIVERSITY

### UNIVERSITY EXAMINATIONS 2010/2011

#### OPEN, DISTANCE AND E-LEARNING EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION AND BACHELOR OF SCIENCE

#### SMA 102: BASIC MATHEMATICS

DATE: Monday 4<sup>th</sup> July 2011

TIME: 8.00a.m – 10.00a.m

---

#### INSTRUCTIONS:

Answer question ONE and any other TWO questions

#### QUESTION ONE

(20 marks)

1. a) The roots of the equation  $2x^2 - 3x - 5 = 0$  are  $\alpha$  and  $\beta$ . Find the value of
  - i)  $\frac{1}{\alpha^2 - 1} + \frac{1}{\beta^2 + 1}$  [2marks]
  - ii)  $\alpha/\beta + \beta/\alpha$  [2marks]
- b) How many permutations are there of all the letters in the word MATHEMATICS? [3marks]
- c) Simplify  $\frac{x^{-1/2} - (x^2 + 1)^{1/2} - x^{1/2} (x^2 + 1)^{-1/2}}{x^{1/2} (x^2 + 1)^{1/2}}$  [3marks]
- d) Evaluate without using tables
$$\frac{\cot \pi/6 \cos \frac{11\pi}{6} - \sin \frac{5\pi}{6}}{\operatorname{cosec}^2 \pi/4 \cos^2 \frac{5\pi}{6}}$$
- e) Express  $-3 - 4j$  in the form  $r(\cos \theta + j \sin \theta)$  [4marks]
- f) Prove that  $(1 - \cos A)(1 + \sec A) = \sin A \tan A$ . [3marks]
- g) Find the remainder when  $x^5 - 4x^3 + 2x + 3$  is divided by  $x + 2$ . [4marks]

**QUESTION TWO****(20 marks)**

- a) Rationalize the denominator and simplify  $\frac{1}{(3\sqrt{2}-1)^2}$  [4marks]
- b) Find the value of  $a$  and  $b$  if the expression  $2x^3 - 15x^2 + ax + b$  is divided both by  $(x - 4)$  and  $(2x - 1)$ . [5marks]
- c) Factorise  $x^4 + x^3 - 3x^2 - 4x - 4$  as far as possible. [4marks]
- d) Solve  $2^{2x-1} - 9(2)^{x-2} + 1 = 0$  [5marks]
- e) Express  $\sqrt{2000}$  in terms of the simplest surd. [3marks]

**QUESTION THREE****(20 marks)**

- a) If  $\sin \alpha = \frac{2}{3}$  and  $\cos \beta = \frac{2}{7}$  find the possible values of  $\cos (\alpha + \beta)$  [4marks]
- b) Given that  $\text{angle } RST = \theta$  and  $\text{angle } SRT = 2\theta$  prove that  $\cos \theta = \frac{r}{2s}$  [4marks]
- c) Find the angles of triangle whose sides are 2: 3: 4. [4marks]
- d) Calculate the radius of a circle given that a segment of it has an area of  $10\text{cm}^2$  and subtends an angle of  $\frac{\pi}{4}$  at the centres. [4marks]
- e) Find the solution of the equation  $4\sin\theta(2\tan\theta + 3) + 6\tan\theta + 9 = 0$ .

**QUESTION FOUR.****( 20 marks)**

- a) State Moivre's Theorem. [2marks]
- b) Find  $(1+j\sqrt{3})^{10}$  [5marks]
- c) Simplify  $\frac{(\cos\theta - j\sin\theta)^7(\cos\theta + j\sin 2\theta)^4}{(\cos 3\theta + j\sin 3\theta)^6(\cos 4\theta - j\sin 4\theta)^2}$  [4marks]
- d) Given that  $z_1 = 3-2j$ ,  $z_2 = -3-4j$ ,  $z_3 = j - 2$ .
- i) Obtain  $3z_1 - 2z_2 + z_3$ , [4marks]
- ii)  $\frac{z_1}{z_2}$  in terms of  $r_1, r_2, \theta_1$  and  $\theta_2$  [5marks]

**QUESTION FIVE****(20 MARKS)**

- a) Evaluate

- i)  $10_{P_6} \square$  [2marks]
- ii)  $19_{P_3} \square$  [2marks]
- b) How many 3-digit numbers can be made from the integers 2, 3, 4, 5, 6 if each digit is used only once. [2marks]
- c) A rugby team consists of 15 players .
- i) How many teams can be selected form a squad of 20? [3marks]
- ii) If 10 players are definitely in the team, how many teams are now possible? [3marks]
- d) i) Expand  $(r + x)^{\frac{1}{2}}$  up to the 4<sup>th</sup> term. [4marks]
- iii) By substituting 0.08 for x in  $(1 + x)^{\frac{1}{2}}$  and its expansion, find  $\sqrt{3}$  correct to 4 sig, fig. [4marks]