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 4th 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 $\propto$ and β. Find the value of

   i) $\frac{1}{\propto^2 - 1} + \frac{1}{\beta^2 + 1}$ [2marks]

   ii) $\propto/\beta + \beta/\propto$ [2marks]

   b) How many permutations are there of all the letters in the word MATHEMATICS? [3marks]

   c) Simplify $\frac{x^{-1/2} - (x^2+1)^{1/2} - x^{1/2}\,(x^2+1)^{-1/2}}{x^{1/2}\ \ (x^2+)^{1/2}}$ [3marks]

   d) Evaluate without using tables

   $$\frac{Cot\ \pi/6 \cos\frac{II\pi}{6} - \sin\frac{5\pi}{6}}{cosec^2\ \pi/4\ \ cos^2\frac{5\pi}{6}}$$

   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 $angle\ RST = \theta\ and\ angle\ SRT = 2\theta$ 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 $10cm^2$ and subtends an angle of $\frac{\pi}{4}$ at the centres. [4marks]

e) Find the solution of the equation $4sin\theta(2\ tan\theta + 3) + 6\ tan\theta + 9 = 0$.

QUESTION FOUR. **(20 marks)**

a) State Moivre's Theorem. [2marks]

b) Find $(1+j\sqrt{3})^{10}$ [5marks]

c) Simplify $\frac{(cos\theta - j\sin\theta)^7(cos\theta + jsin2\theta)^4}{(\cos 3\theta + jsin\ 3\ \theta)^6\ (cos4\theta - jsin\ 4\theta)^2}$ [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} [2marks]

ii) 19_{P_4} [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 $(r+x)^{½}$ up to the 4^{th} term. [4marks]

iii) By substituting 0.08 for x in $(1 + x)^{½}$ and its expansion, find $\sqrt{3}$correct to 4 sig, fig. [4marks]