(A Constituent college of Jomo Kenyatta University of Agriculture & Technology)

SCHOOL OF PURE AND APPLIED SCIENCE

END OF SEMESTER EXAMS SEMESTER 1 2015/2016

SMB 0101 ALGEBRA AND BUSINESS MATHEMATICS

CLASS: CERTIFICATE IN BRIDGING MATHEMSTICS

DATE: 11TH DECEMBER, 2015 **TIME 2hrs**

Instructions; Answer question ONE and any other TWO questions

1. (a) solve the following simultaneous equation

$x + 2y - 3z = 10$
$2x - y + 2z = -1$
$3x + 2y + z = 6$ [6mks]

(b)The 20th term of an arithmetic sequence is 60 and the 16th term is 20. Find the first term and the common difference. [4marks]

(c) Solve the equation $2x^2 + 5x = 3$ by completing square method. [5marks]

(d) Given that $\frac{D}{d} = \sqrt{\frac{f+p}{f-p}}$ make p the subject of the formula [4marks]

(e) Find the value of x in the equation $4^{3x-2} = 26^{x+1}$ [4marks]

(f)The determinant of the matrix below is 6, find the value of x.

$$\begin{vmatrix} X & X \\ 4 & 2X \end{vmatrix}$$ (4marks)

(d) In how many ways can a 3 digits number can be formed from 1,2,3,4 and 5? (3marks)

2. (a) Solve the following using matrix method:

$4x - 3y = 18$
$x + 2y = -1$ (6marks)

(b) The following is geometric series $9 + 3 + 1 + \frac{1}{3} + \ldots\ldots\ldots$, find the sum of all the terms i.e. upto infinity. [3mks]

(c) Given that y varies inversely as x and that when y=6, x=44 find;

(i) equation connecting x and y

(ii) y when x=2 (4mks)

(d) In how many ways can a committee of 4 people be chosen from 7 people? (4mks)

(e) Given that $I = PV^n$ make n the subject of the formula. [3mks]

3. (a)The sum of the first 20 terms of an arithmetic series is $7\frac{1}{2}$. If the third term of the series is 2, find the sum of the first 13 terms. [5mks]

(b) The matrix below is singular find the unknown.

$$\begin{bmatrix} 4x & 2 \\ 5 & 2 \end{bmatrix}$$ [3mks]

(c) Find the value of x in the equation; Log(x-1) +log (x+1) =2log (x+2) [5mks]

(d) The value of a house was Ksh 2560000 three years ago. If it appreciates at the rate of 3% per annum what will be the value of the house next year. [4mks]

(e) A trader sold an item at ksh 1350, this was after allowing a discount of 10%. If he did not give the discount he would have made a profit of 20%, how much did the trader buy the item? 3mks

4. (a) Solve the following equation using factorization method $x^2 - x - 6 = 0$ [4marks]

(b) Solve the following simultaneous equation using substitution method:

$4x - 3y = 18$
$x + 2y = -1$ (3marks)

(c) John was collected a total Ksh 190 being offering in Sunday school on certain Sunday, there were twice 10 shillings coins as many as 20 shillings coin, 5 shillings coins exceeded 20 shillings coin by one coin while 10 shillings coin were more than 1 shilling coin by 3 coins. Find number of coins per each denomination. [4mks]

(d) Expand the following $(1+ x)^7$ up to the term with x^3 and use your expansion to estimate $(1.05)^7$ [5marks]

(e) Simplify the following;

$$\frac{\log_{16} 2 - \log_4 64}{4\log_8 2 - 3\log_{27} 3}$$

4mks

5. (a) A vehicle was depreciating at the rate of 12% annually, if the value of the vehicle is Ksh 524880 today what was the value of the vehicle 4 years ago. 3mks

(b) Find the value of x in the equation; $X^{1.5} = 14.91$ 3mks

(c) In how many ways would six people sit on a bench? (2mks)

(d) Given that y varies directly as x and when x=2, y=3. Find y when x=12. (3mks)

(e) Mr. john paid a certain item Ksh 580 which was inclusive of 16% V.A.T., what the price of the item before tax. (3mks)

(f)Find $\begin{bmatrix} 5 & -2 & 4 \\ 2 & -3 & 7 \end{bmatrix} \times \begin{bmatrix} 1 & 3 \\ -5 & 2 \\ 4 & 6 \end{bmatrix}$ (3mks)

(g) Given the ratio of a to b is 2:3 and the ratio of b is to c is 4:5 and the ratio of c tod is 1:4. Find the ratio of a tod. (3mks)