



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)  
University Examinations for 2015/2016 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

## FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN ELECTRICAL AND ELECTRONICS

EBC 200: MATHEMATICS 111

Date: 1/8/2016

Time: 2:00 – 4:00 PM

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### INSTRUCTIONS:

Answer Question one and any other **two** questions

### QUESTION ONE (COMPULSORY)

- a) Given that  $A = \begin{bmatrix} 4 & 6 \\ 1 & 9 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & -5 \\ -3 & 9 \end{bmatrix}$
- i) Find  $A+B$  (3 marks)
- ii) Find  $A-B$  (3 marks)
- b) Find the mean of the data below;  
15, 18, 16, 14, 15, 15, 12, 17, 90, 95 (4 marks)
- c) A student has gotten the following grades on his test 87, 95, 76, and 88. He wants an 85 or better overall. What is the minimum grade he must get on the last test in order to achieve that average (5 marks)
- d) Find the mode and median of the data below; 13, 18, 13, 14, 13, 16, 14, 21, 13 (4 marks)
- e) Given that  $C = \begin{bmatrix} 4 & 2 \\ 1 & 9 \end{bmatrix}$ ,  $D = \begin{bmatrix} 2 & -6 & 2 \\ -1 & 0 & 4 \end{bmatrix}$  Find  $CD$  (5 marks)
- f) Find the determinant and the inverse of;  $\begin{bmatrix} 4 & 2 \\ -2 & 6 \end{bmatrix}$  (6 marks)

## QUESTION TWO: (20 MARKS)

- a) Give the simultaneous equation below; (10 marks)
- $$\begin{aligned}3x - 3y &= 3 \\2x + 4y &= 8\end{aligned}$$
- i) Write in matrix form  
ii) Find the determinant of the coefficient matrix  
iii) Find the inverse of the coefficient matrix  
iv) What is the value of x and y?
- b) Given the data 12, 4, 6, 2 (10 marks)
- i) Find the mean  
ii) Find the variance  
iii) Find the standard deviation

## QUESTION THREE

- a) A jar contain 3 red marbles, 7 green marbles, and 10 white marbles. If a marble is drawn from the jar at random, what is the probability that this marble is white? (5 marks)
- b) A die is rolled, find the probability that an even number is obtained. (5 marks)

## QUESTION FOUR

- a) Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number that is a multiple of 3 or 5? (6 marks)
- b) Solve using the matrix method (8 marks)
- $$\begin{aligned}2x + 4y &= 6 \\3x + 5y &= 7\end{aligned}$$
- c) Evaluate the determinant and the inverse of (6 marks)
- $$\begin{bmatrix} 1 & -4 \\ 0 & 3 \end{bmatrix}$$