# MACHAKOS UNIVERSITY

**University Examinations for 2018/2019**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY**

**FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR**

**BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

**SCO 104: COMPUTER ORGANIZATION AND ARCHITECTURE 1**

**DATE: 23/7/2019** **TIME: 8.30-10.30 AM**

**INSTRUCTIONS**

Answer **question ONE and any other TWO questions.**

**SECTION A: COMPULSURY(30 MARKS)**

**QUESTION ONE**

a) Using an illustration, describe the structure of CPU and explain the function of its components. (8 marks)

b) State **FOUR** features of bus interconnection structure (4 marks)

c) Provide a convincing justification for implementation of cache and virtual memory (6 marks)

d) Mention **THREE** benefits of RAID systems (3 marks)

e) Use logic gate notations to implement the function $X = A + B\overline{C}$ (5 marks)

f) Showing your working convert the following numbers to decimal and binary respectively

i. $10011112_2$

ii. $11410_{10}$ (4 marks)

**QUESTION TWO**

a) Explain interleaving and bust access mode as memory performance enhancements technique (3 marks)

b) Describe how hard disk is internally structured in terms of cylinder, heads, trucks, and sectors and explain five factors affecting its performance (8 marks)

c) Distinguish between SCSI and IDE Hard disk interface (4 marks)

**QUESTION THREE**

a) Explain the function of input and output system under the following:

i. Control and timing

ii. CPU communication

iii. Device communication

iv. Data buffering

v. Error detection (10 marks)

b) Using an illustration, describe the non-Neumann structure and mention six Non-Neumann specifications (5 marks)

**QUESTION FOUR**

a) The information stored in an n level memory hierarchy, mi to mn, should satisfy the three important properties of inclusion, coherence and locality. Explain the three properties (6 marks)

b) Describe the cache replacement policies and state the suitability of each of the algorithms (5 marks)

c) The most universally acceptable method of classifying processes is Flynn taxonomy. Discuss four categories based on classification (4 marks)

**QUESTION FIVE**

a) Showing your working convert the following numbers from decimal to binary

i. $139_{10}$

ii. $53_{10}$ (2 marks)

b) Differentiate between a:

(i) MAR and MBR

(ii) PC and AC (4 marks)

c) Explain the following:

(i) AND Gate

(ii) OR Gate

(iii) NOT Gate

(iv) NAND Gate (4 marks)

d) Briefly describe bus arbitration and explain **TWO** types of arbitration schemes (5 marks)