



SCOTT CHRISTIAN UNIVERSITY
PROGRAMME: BACHELOR OF SCIENCE IN INFORMATION COMMUNICATION
TECHNOLOGY
UNIT NAME: COMPUTER ORGANIZATION AND ARCHITECTURE
UNIT CODE: BCT 111
DECEMBER 2017 EXAM

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO
EXAM DURATION 3 HOURS

SECTION A: COMPULSURY

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 $X = A + B\bar{C}$ (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, m_i to m_n , 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)