



(Knowledge for Development)

KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR FOUR SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF SCIENCE
COMPUTER SCIENCE**

COURSE CODE : CSC 454E

**COURSE TITLE : ADVANCED MICROPROCESSOR
ARCHITECTURE**

DATE: 26/09/2017 TIME: 11:30 A.M – 1:30 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

- 1)
 - a) Highlight any four different types of major applications of processors and their influence the design of microprocessors (4 marks)
 - b) Outline three pieces of information required to be maintained by each cache entry in order to perform cache tagging (3 marks)
 - c) Explain two solutions to pipeline hazard (4 marks)
 - d) State Amaldah's Law and its significant in processor design (4 marks)
 - e) Discuss the limitations of parallel computing with regard to power consumption and computational power. (4 marks)
 - f) Describe the term Endian approach to multibyte storage and distinguish between Big Endian and Little Endian approaches. (3 marks)
 - g) Describe a register bank and illustrate how a register bank is used implemented to increase the number of registers in a CPU. (4 marks)
 - h) Describe the superscalar approach to processor design (4 marks)

- 2)
 - a) Explain any four factors that influence the inclusion of registers in a microprocessor (4 marks)
 - b) Describe the concept of superpipeline processor design and outline the challenges that come with the design (10 marks)
 - c) Identify and discuss any two factors that affect the size of cache on a chip. (6 marks)

- 3)
 - a) Using suitable illustrations, highlight the following forms of parallel computing: (12 marks)
 - i) Bit-level
 - ii) Instruction level
 - iii) Data parallelism
 - iv) Task parallelism
 - b) Discuss how hardware-level support is achieved in parallel computing with regard to: (4 marks)
 - i) Multicore
 - ii) multiprocessors
 - c) Outline the merits of Harvard architecture over the Princeton architecture. (4 marks)

- 4)
 - a) States Moore's Law and its implication to the design microprocessors. (4 marks)
 - b) Describe the following microprocessors design approaches, highlighting their merits and demerits. (16 marks)
 - i) RISC
 - ii) CISC
 - iii) VLIW
 - iv) DSP

- 5)
 - a)
 - i) Describe what is meant by single-cycle processors design (3 marks)
 - ii) Critic single-cycle processors design by highlighting their benefits and shortfalls (7 marks)
 - b) Distinguish between a VLIW design and a superscalar design of the processor (10 marks)