



**KIBABII UNIVERSITY COLLEGE**

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**UNIVERSITY REGULAR EXAMINATIONS**

**2013/2014 ACADEMIC YEAR**

**Second SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
POST GRADUATE DIPLOMA IN ICT**

**COURSE CODE:** PGD 723

**COURSE TITLE:** PARALLEL ARCHITECTURES

**DATE:** 21<sup>ST</sup> AUGUST, 2014

**TIME:** 9:00A.M.-12NOON

**INSTRUCTIONS TO CANDIDATES**

Attempt Questions ONE. and Any other TWO from the following five questions.

### QUESTION ONE (30marks)

- 1(a)(i) Explain the need for parallel architectures. 2 mark  
 (b) With aid of an example outline Flynn classification of architectures 4 marks  
 c) Compare the two microprocessor types in respect to the stated tasks

TASK	SHARED MEMORY MICROPROCESSOR	MESSAGE PASSING MICROPROCESSOR
Interprocess communication		
Memory read/write		
Message through switch		
Collision avoidance		

4 marks

- d) **A program has 20%** Floating point instructions that can be executed in parallel, the rest of the program is serial . Juma wants to speed up the system by increasing one of the section by a factor of two. Evaluate the two probabilities and state which is the better approach. 6d marks
- e) Outline the implication of interconnection networks in parallel architecture 6 marks
- f) Discuss the statement that subjecting the a processor who architecture is unknown to fine and course grain data you identify the architecture. 4 marks
- (h) Define the following computer type;
- I multicores
  - ii multiprocessor
  - III multicomputer
  - Iv networked computers

4 marks

#### Question Two ( 20marks)

- (a) List the Condition for Deadlock to occur and how the condition can be prevented from happening 8 marks
- (b) Explain the concept of multithreading [ 6 marks
- © A program runs in 10 seconds on a computer “A” that has 400 MHz clock. It is desirable to design a faster computer “B” that could run the program in 6 seconds. The designer has determined that a substantial increase in the clock speed is possible, however it would cause computer “B” to require 1.2 times as many clock cycles as computer “A”. Determine the clock rate of computer “B”?. 6 marks

#### Question Three ( 20marks)

- a) Discuss I/O and scheduling as applied to parallel Architectures **10 marks**
- b) *Discuss the statement towards architecture convergence* *10 marks*

#### Question Four ( 20marks)

- (a) Outline the design issues as applied to parallel architectures 5 marks
- (b) Summarize Hardware/Software Performance Tradeoffs 8 marks
- c) Highlight Parameters that characterize a network 7 marks

QUESTION FIVE ( 20marks)

- (a) Using the expression  $Exp = A+B+C+(D * E * F)+G+H$  illustrate how a smart compiler can take advantage of parallelism embedded in computer architecture 10 marks
- b) Outline the challenges of realizing programming models in the large 6 marks
- c) *Explain two factors that complicate multiprocessor scheduling* 4 marks