(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER TWO EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

COURSE CODE : CSC 315

COURSE TITLE : COMPUTER ARCHITECTURE

DATE: 15/02/2021 TIME: 08.00 A.M – 10.00 A.M

INSTRUCTIONS TO CANDIDATES

ANSWER **QUESTIONS ONE** AND **ANY OTHER TWO.**

QUESTION ONE [COMPULSORY][30 MARKS]

a) Define the following terms:

i) Computer architecture (1 mark)
ii) Instruction set (1 mark)
iii) Interrupt (1 mark)
iv) Bus (1 mark)

b) Discuss how the following factors affect the performance of CPU

i) Clock speed (2 marks)
ii) Cache memory capacity (2 marks)
iii) I /0 devices (2 marks)
iv) Bus width (2 marks)

c) Distinguish the following terms

i) CISC and RISC architectures (2 marks)
ii) Trasistors and integrated circuits (2 marks)
iii) Synchronous and asynchronous timing (2 marks)
iv) Spatial and temporal locality of reference (2 marks)

d) Explain the major features of Von Neumann architecture. (4 marks)

e) What is the general relationship among access time, memory cost and capacity of cache memory? (6 marks)

QUESTION TWO [20 MARKS]

a) List the three broad classifications of external devices. (3 marks)

b) Name the five major functions of an 1/0 module. (5 marks)

c) When a device interrupt occurs, how does the processor know which device issued the interrupt? (6 marks)

b) Explain the following input output techniques.

i) Programmed I/O (2 marks)
ii) Interrupt – driven I/O (2 marks)
iii) Direct Memory Access (2 marks)

QUESTION THREE [20 MARKS]

a) Describe the three properties common among all semiconductor memory **cells**. (3 marks)
b) Identify and describe the four access methods used in cache memory. (8 marks)
c) Discuss how the memory hierarchy operates. [5 Marks]
d) Briefly describe the write back and write-through policies of the cache memory. [4 Marks]

QUESTION FOUR [20 MARKS]

a) How does the principle of locality relate to the use of multiple memory levels? (2 marks)
b) Describe four strategies (two each) for exploiting spatial locality and temporal locality (4 marks)
c) What is the key property of random access memory? [2 Marks]
d) Describe the similarity between read-only memory and read mostly memory [2 marks]
e) Explain why dynamic random access leaks charges while static random access memory does not [2 Marks]
f) Describe the characteristic similarity (in terms of property) and three differences (in terms of speed, size and cost) between dynamic random access memory and static random access memory [5 Marks]
g) Name three techniques used in mapping main memory blocks into cache lines [3 Marks]

QUESTION FIVE [20 MARKS]

a) What are the advantages of using a glass substrate for a magnetic disk? (5 marks)
b) Briefly discuss how data is read and written onto a magnetic disk. (4 marks)

c) Describe three differences between a CD and a DVD that account for the larger capacity of the latter. (3 marks)

d) What common characteristics are shared by all RAID levels? [3 Marks]

e) List and briefly explain five important instruction set design issues. (5 marks)