UGANDA MARTYRS UNIVERSITY

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS

END OF SEMESTER FINAL ASSESSMENT

SEMESTER I, 2023/24

THIRD YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

EMBEDDED SYSTEMS DESIGN

DATE: 13TH DEC 2023 TIME: 9: 30 – 12: 30 PM DURATION: 3HRS

Instructions:

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1. Carefully read through ALL the questions before attempting
2. Attempt **ANY FOUR (4)** Questions. Section A is Compulsory and any Three (3) Questions in Section B
3. Answers for each of the Questions attempted should start on a new page.
4. No names should be written anywhere in your report and presentation.
5. Ensure that your Registration Number is indicated on all page of the examination answer booklet.
6. Ensure your work is clear and readable with examples. Untidy work shall be penalized.
7. Any type of examination Malpractice will lead to automatic disqualification.
8. Do not write anything on the question paper.

SECTION A

Question One:

a) Explain any three important considerations when selecting a processor for use in Embedded systems Design. (3 Marks)

b) What is watch dog timer? (1 Mark)

c) Define RAM as used in Embedded systems. (1 Mark)

d) Define the main components of an embedded system. (6 Marks)

e) What are the various classifications of embedded systems? (3 Marks)

f) Define interrupt latency? What may cause it and how to avoid it. (3 Marks)

g) What are the essential units of a processor on an embedded system? (2 Marks)

h) What are the applications of an embedded system? (3 Marks)

i) What do you understand by the term machine cycle? (1 Mark)

j) What are the functions of memory? (2 Marks)

SECTION B

Question 2

a) In what ways do CISC and RISC processors differ?

b) With the help of block diagrams, explain and compare the von-Neumann and Harvard architecture

c) Give three differences between a sensor and an actuator.

d) Name 4 tools used in programming embedded systems design

Question 3

a) Write short notes on the following

i. Address bus

ii. Synchronous Data Bus

iii. Control Bus

iv. Bus handshaking with wait state

v. A data Bus

b) Examine how real time systems differ from conventional systems. What is the necessity of real time systems in Embedded Systems?

Question 4

(a) Discuss the different stages involved in the design process of an embedded system.

(b) Name 4 tools used in programming embedded systems.

(c) Briefly name six of the major components of an embedded system.

(d) Explain any two number systems used in embedded systems programing.

Question 5

(a) Explain the concept of Analog-to-Digital Conversion (ADC) in embedded systems.

(b) Why is it important to convert Analog Signals to Digital Signals in embedded systems?

(c) Discuss the challenges and limitations of ADCs in embedded systems.

(d) What are common memory problems in embedded systems?

Question 6.

Write short notes on the following

(i) Address bus
(ii) Synchronous Data Bus
(iii) Control Bus
(iv) Bus handshaking with wait state
(v) A data Bus

END