UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)

CSC 463: EMBEDDED SYSTEMS

DATE: APRIL 10, 2018   TIME: 2:00 PM – 4:00 PM

INSTRUCTIONS:

Answer Question ONE and ANY other two Questions

QUESTION ONE (30 MARKS)

a) Describe how the following components affect the design choices in Embedded systems

(10 marks)

    i)   Memory

    ii)   Processing Power

    iii)   Reliability

    iv)   Power consumption

    v)   Development cost

b) Describe any 4 application areas of embedded systems with examples   (10 marks)

c) Differentiate between real-time and embedded   (4 marks)

d) Design and code a program that can interact with controllers and instrumentation devices, both digital and analogue.   (6 marks)

QUESTION TWO (20 MARKS)

a) Explain in detail about microprocessor programming with the aid of diagrams

(10 marks)

b) Differentiate between microprocessors and microcontrollers with the aid of clear diagrams

(10 marks)

QUESTION THREE (20 MARKS)

a) Discuss in detail about Intel 80x86 microprocessor   (6 marks)

b) Write the program to solve the following expression in a microprocessor(y=mx+c) given that y=500,x=30,m=-55 in a microprocessor   (6 marks)

c) Discuss any FOUR registers and their functionality in programming a microprocessor

(8 marks)

QUESTION FOUR (20 MARKS)

a) Discuss in detail about simulators and sensors   (6 marks)

b) Explain in detail the functionality of DMA (Direct Memory Access)   (6 marks)

c) Discuss any 4 types of busses giving clear functions of each   (8 marks)

QUESTION FIVE (20 MARKS)

a) Describe the following real-time schedulers   (8 marks)

    i)   Earliest deadline first

    ii)   Minimal laxity first

    iii)   Real-time executive

    iv)   Resource reservation

b) Explain about deadlock in detail   (6marks)

c) Discuss about priority inversion with the aid of a diagram   (6 marks)

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