NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
DECEMBER EXAMINATIONS 2004

COURSE: **Microprocessors and Operating Systems**

CODE: **SCS 5104**

INSTRUCTIONS TO CANDIDATES

This question paper consists of **Five** questions.
Answer **any four (4)** questions

QUESTION ONE

a) Draw a block diagram of a CRT controller and explain the role of shift registers in your diagram. [10]
b) Distinguish between processor architecture and microprocessor architecture. [5]
c) Write brief notes on the following microprocessor design techniques.

    i.   Speculative execution [5]
    ii. Branch prediction [5]

QUESTION TWO

a) Assume that memory location 2075H has data byte 47H. Specify the contents of the address bus A15-A8 and the multiplexed bus AD7-AD0 when the microprocessor reads that location [3]
b) Explain how the DAD instruction of the Motorola MC6800 operates. [4]
c) Describe the differences between a transparent input buffer and a latched input buffer [3]
d) State and describe any five functions performed by a real-time executive of an operating system. [10]
e) What is the relationship between the microprocessor's addressable space and the virtual memory created by an operating system? [5]

QUESTION THREE

a) The 8085-microprocessor instruction set can be classified into five categories. Describe each category, giving specific examples of instructions in each case. [10]
b) Given the Intel 8085 microprocessor instruction MVI A, 40*H*. Answer the following questions.

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i. With the aid of a timing diagram, explain all the stages in the execution of this instruction [9]

c) What is virtual memory and how does it work? [6]

QUESTION FOUR

a) Both the Intel 8085 microprocessor and the *MC*6800 microprocessor have 40 pins. Outline the architectural difference of the two microprocessors. [15]

b) Explain how UNIX implements its file system. [10]

QUESTION FIVE

a) Compare and contrast RISC and CISC architectures and outline the future of the architectures. [8]

b) Explain the importance of each of the following concepts in microprocessors
   i. Word length [3]
   ii. Address bus [3]
   iii. Addressing modes [4]

c) Describe the relationship between cache, virtual memory and the translation look-aside buffers. [7]

END OF QUESTION PAPER

GOOD LUCK!