NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
MAY/JUNE 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) Read the following Assembly language program and write the missing comments. [10]

Label	Opcode	Operand	Comments
START:	LXI	H, XX50H	;
	LXI	D, XX70H	;
	MVI	B,10H	;
NEXT:	MOV	A,M	;
	STAX	D	;
	INX	H	;
	INX	D	;
	DCR	B	;
	JNZ	NEXT	;
	HLT		;

b) Calculate the time it will take the processor to complete executing this program . [4]
c) Draw a flow chart for the program. [9]
d) Describe any two microprocessor scheduling techniques [2]

QUESTION TWO

a) What is stack and for what purpose is it used for in a microprocessor system [10]
b) Describe the 8085 microprocessor bus system [10]
c) State the advantages of semaphores in an operating system [5]

QUESTION THREE

a) Explain how Flash Memory operates and state its advantages and disadvantages over RAM. [10]
b) UNIX operating system is a layered operating system. Discuss [10]
c) A process contains eight (8) virtual pages on disk and is assigned a fixed allocation of four (4) page frames in memory. The following page trace occurs:
1, 0, 2, 2, 1, 7, 6, 7, 0, 1, 2, 0, 3, 0, 4, 5, 1, 5, 2, 4, 5, 6, 7, 6, 7, 2, 4, 2, 7, 3, 3, 2, 3
a) Assuming the frames are initially empty. Calculate the hit ratio given that LRU replacement strategy is used. [5]

QUESTION FOUR

a) Explain in Mathematical terms how the operating system maps the addresses from main memory into virtual memory and vice versa. [10]

b) Which registers in an 8085 are 16-bit registers? Give reasons why it is essential for these registers to be four nibbles wide. [5]

c) Explain how a paged virtual memory system works. [10]

QUESTION FIVE

a) Placement strategies are irrelevant in paged systems? Discuss [10]

b) Outline various strategies for recovery from a deadlock [5]

c) Write a program in assembly language to add the following two hexadecimal numbers and store the results in register pair HL. [10]

END OF QUESTION PAPER