

KABARAK



UNIVERSITY

EXAMINATIONS

2009/2010 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT
& INFORMATION TECHNOLOGY**

COURSE CODE: BMIT 227

COURSE TITLE: OPERATING SYSTEMS

STREAM: Y2S2

DAY: FRIDAY

TIME: 9.00 – 12.00 P.M

DATE: 04/12/2009

INSTRUCTIONS:

1. This question paper has **FIVE** questions
2. Answer question **ONE** and any other **THREE** questions

PLEASE TURN OVER

QUESTION ONE (40 MARKS) COMPULSORY

- (a) Explain the meaning of the following terms
 - i. PCB
 - ii. Streams
 - iii. Context switch
 - iv. Semaphore
 - v. Response time (10mks)
- (b) Distinguish between the following
 - i. A virus and a worm
 - ii. Spooling and buffering
 - iii. Static relocation and dynamic memory relocation (6mks)
- (c) Scheduling selects jobs to be processed in the CPU. Explain four functions of scheduling (4mks)
- (d) Differentiate between Process Control and File Interrogations systems (3mks)
- (e) Explain with the aid of a diagram, a level two DOS directory structure (5mks)
- (f) What would be the output of the following batch file when executed? (3mks)

```
@echo off
FOR %%a IN (1 2 3) DO echo Steve
Echo Steve printed
REM end
```

- (g) For an Operating System to be a truly distributed system, it must adhere to some given design rules. Explain and four design issues adhered to by a distributed system. (4mks)
- (h) Use HRRN to determine the average waiting time for the following processes (5mks)

Process	Arrival Time	Burst
P1	0	7
P2	2	1
P3	3	2

QUESTION TWO (20 MARKS) ELECTIVE

- (a) Distinguish between a process and a thread (2mks)
- (b) Discuss three benefits of process synchronization (6mks)
- (c) Cooperating processes can form one major problem; a deadlock. Describe four necessary conditions for a deadlock to occur (8mks)
- (d) Explain the prevention method for each deadlock condition in (c) above (4mks)

QUESTION THREE (20 MARKS) ELECTIVE

- (a) What is formatting (2mks)
- (b) State and explain any three filing systems (3mks)
- (c) Distinguish between the following giving an example of each
 - i. absolute and relative path specification
 - ii. system and application files (6mks)
- (d) A good file allocation policy to storage media that allows files to “grow” and “shrink” is non-continuous file allocation. Discuss any three non-continuous file allocation techniques including at least one advantage and one disadvantage of each. (9mks)

QUESTION FOUR (20 MARKS) ELECTIVE

- (a) Compare and contrast segmentation and dynamic partitioning (5mks)
- (b) The figure below shows allocation of processes A, B, C and D of various pages to 14 memory frames.

0	A ₀	A ₁	A ₂	A ₃	D ₀	D ₁	D ₂	C ₀	C ₁	C ₂	C ₃	D ₃	D ₄	D ₅	13
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- i. Explain what a page table is (2mks)
- ii. Draw the page table for process D (3mks)

(c) The following are **eight** consecutive free memory blocks at a given memory allocation time:

- i. 9mB,
- ii. 12mB,
- iii. 6mB,
- iv. 13mB,
- v. 8mB,
- vi. 4mB,
- vii. 7mB and
- viii. 10mB.

If the last placement is the block between 6mB and 13mB space,

- i. Locate the placement of 5mB followed by 11mB requests using the four dynamic partitioning placement algorithms (8mks)
- ii. Identify and explain the algorithm that maximizes the 5mB memory space usage (2mks)

QUESTION FIVE (20 MARKS) ELECTIVE

- (a) Distinguish between
 - i. Preemptive and non preemptive algorithm schemes
 - ii. I/O bound and processor bound processes (4mks)
- (b) Describe any three short-term scheduling criteria to be achieved by scheduling (6mks)
- (c) i. Determine the average waiting time for the following processes using FCFS, SRTF and $RR_{q=3}$. (8mks)

<u>Process</u>	<u>Arrival Time</u>	<u>Burst</u>
P	0	8
Q	1	2
R	3	5

- ii. Which algorithm among FCFS, SRTF and $RR_{q=3}$ can best be used for the three processes? Explain (2mks)