



MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

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**FINAL EXAMINATION  
JANUARY 2016 SEMESTER**

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**COURSE CODE** : IFD20403  
**COURSE NAME** : OPERATING SYSTEM  
**LEVEL** : DIPLOMA  
**TIME / DURATION** : 2.00 pm – 4.00 pm  
( 2 HOURS )  
**DATE** : 23 MAY 2016

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper CAREFULLY.
  2. This question paper is printed on both sides of the paper.
  3. This question paper consists of TWO (2) SECTION, SECTION A and SECTION B.
  4. Answer ALL questions in SECTION A, and ONLY THREE (3) questions in SECTION B.
  5. Please write your answers using the answer booklet for both sections.
  6. Answer all questions in English.
  7. Please DO NOT use pencil for answering the questions.
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THERE ARE 10 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

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**SECTION A (Total: 25 marks)****MULTIPLE CHOICE QUESTIONS****INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.**

1. A program that acts as an intermediary between a computer user and the computer hardware is known as:
  - A. Operating System
  - B. Process
  - C. Terminal
  - D. Kernel
2. A software-generated interrupt caused either by an error or a user request is called:
  - A. Trap
  - B. Bug
  - C. Interrupt Vector
  - D. None of the above
3. Name two types of multiprocessing:
  - A. Asymmetric and Symmetric
  - B. Passive and Active
  - C. Volatile and Nonvolatile
  - D. Parent and Child
4. A program in execution is called:
  - A. Resource
  - B. Process
  - C. Application
  - D. All of the above
5. Which of the following do not belong to queues for processes?
  - A. Job Queue
  - B. Ready Queue
  - C. Device Queue
  - D. Long Queue

6. What is a long-term scheduler?
  - A. It selects which processes should be brought into the ready queue
  - B. It selects which processes should be executed next
  - C. It handles CPU allocation
  - D. All of the above
  
7. The link between two processes P and Q used to send/receive messages is called:
  - A. Unidirectional Link
  - B. Communication Link
  - C. Bidirectional Link
  - D. Process Link
  
8. In message passing mechanism, blocking is considered:
  - A. Asynchronous
  - B. Synchronous
  - C. Bounded
  - D. Unbounded
  
9. The time taken by a process to complete its execution is called:
  - A. Burst Time
  - B. Response Time
  - C. Turnaround time
  - D. Waiting Time
  
10. Priority-based algorithm suffers from the problem of:
  - A. Deadlock
  - B. Aging
  - C. Starvation
  - D. None of the above
  
11. Which of the following is the visual (mathematical) way to determine the deadlock occurrence?
  - A. Starvation Graph
  - B. Aging Graph
  - C. Resource Allocation Graph
  - D. Wait For Graph

12. A "Hold and Wait" condition can be described as:
- A. A process that is not holding any resource
  - B. A process holding at least one resource and waiting to acquire additional resources held by other processes
  - C. A process that is not waiting to acquire additional resources
  - D. None of the above
13. An operating system can be defined as a resource allocator and a:
- A. Process
  - B. Kernel
  - C. Terminal
  - D. Control Program
14. An initial program that is ran for a computer to start running is called:
- A. Bootstrap
  - B. ROM
  - C. EPROM
  - D. Firmware
15. File type can be represented by:
- A. File Name
  - B. File Extension
  - C. File Identifier
  - D. All of the above
16. Which of the following command is used to display the content of a directory?
- A. cat
  - B. touch
  - C. ls
  - D. mkdir
17. mv command is used to:
- A. Rename a file
  - B. Rename a directory
  - C. Move a file or directory
  - D. All of the above

18. Which of the following command is used to delete a directory?
- A. `rm -f`
  - B. `del`
  - C. `rm -r`
  - D. `clear`
19. `pwd` command is used to:
- A. Remove user password
  - B. Modify user password
  - C. Display user password
  - D. None of the above
20. Consider the program *tree* is missing, which of the following command is used to enable that missing program:
- A. `sudo apt-get update tree`
  - B. `sudo apt-get upgrade tree`
  - C. `sudo apt-get install tree`
  - D. `sudo apt-get enable tree`
21. The root directory of a partition in a Unix system is named `/`.
- A. True
  - B. False
22. Process Control Block is also known as Task Control Block.
- A. True
  - B. False
23. A program is an active entity.
- A. True
  - B. False
24. If a system is not in a safe state, there is no deadlock.
- A. True
  - B. False

25. In scheduling criteria, waiting time is the amount of time a process has been waiting in the ready queue.
- A. True
  - B. False

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**SECTION B (Total: 75 marks)****INSTRUCTION: Answer ONLY THREE (3) questions.****Please use the answer booklet provided.****Question 1**

- a. What are the different types of information stored in PCB? Provide examples for each of them.

**(7 marks)**

- b. Describe the **FIVE (5)** different states of a process with the help of a transition diagram.

**(10 marks)**

- c. Context switching is a combination of two functions. Explain both functions.

**(4 marks)**

- d. Differentiate between I/O-bound and CPU-bound processes.

**(4 marks)****[25 marks]****Question 2**

Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P1	11	3
P2	2	1
P3	3	3
P4	2	4
P5	6	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

- a. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller number implies a higher priority), and RR (quantum = 2).

(12 marks)

- b. What is the waiting time for each process for each of these scheduling algorithms?

(8 marks)

- c. Which of the algorithms results in the minimum average waiting time (overall processes)?

(5 marks)

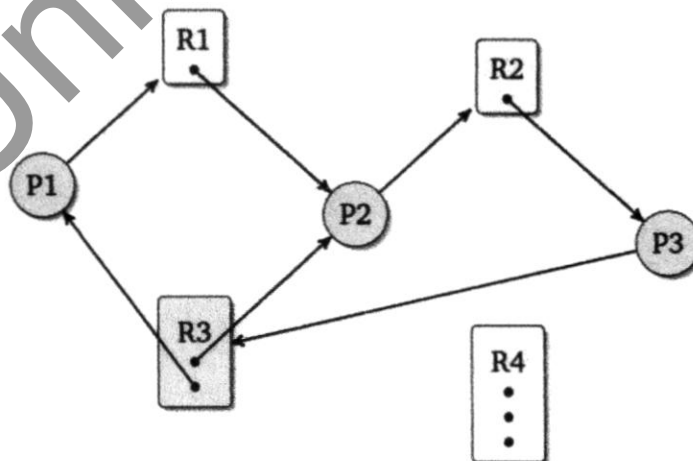
[25 marks]

### Question 3

- a. Describe the **FOUR (4)** necessary conditions for a deadlock to occur.

(8 marks)

- b. From the following resource allocation graph, explain whether the system is in a safe state or a deadlock state. Give reasons for your answer.



(4 marks)



- c. Consider the following scenario:

$P = \{P1, P2, P3, P4\}$

$R = \{R1, R2\}$

$E = \{P1 \rightarrow R1, R1 \rightarrow P2, R1 \rightarrow P3, P3 \rightarrow R2, R2 \rightarrow P1, R2 \rightarrow P4\}$

Furthermore we have two instances of resource type R1, and two instances of resource type R2.

- i. Draw resource allocation graph from the above given data.

(9 marks)

- ii. From the resource allocation graph you draw, explain whether the system is in a safe state or a deadlock state. Give reasons for your answer.

(4 marks)

[25 marks]

#### Question 4

- a. In Unix-like operating systems, there are **FOUR (4)** types of classes associated with access permissions to file system objects. What does each of these classes represent?

(4 marks)

- b. What does the following command perform: `chmod o-r test.txt`

(2 marks)

- c. What does the following command perform: `chmod a+w test.txt`

(2 marks)

- d. What does the following command perform: `chmod g-r test.txt`

(2 marks)

- e. What does the following command perform: `chmod u+x test.txt`

(2 marks)

- f. What does the following command perform: `chown root:sysadmin test.txt`  
(3 marks)

- g. Convert the following to their respective equivalent octal form and provide short description for each:

Symbolic Form	Octal Form	Description
<code>rwxrwx-r--</code>		
<code>rw-r-xr--</code>		
<code>rwxr-xr-x</code>		

(10 marks)

[25 marks]

END OF EXAMINATION PAPER

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