

**OPERATING SYSTEMS CONCEPTS
(INFO 3101)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) The PCB stands for
 - (a) Process Controller Block
 - (b) Process Controlled Block
 - (c) Process Control Block
 - (d) Processed Control Block.
- (ii) FIFO scheduling is
 - (a) Fair-share scheduling
 - (b) Deadline scheduling
 - (c) Preemptive scheduling
 - (d) Non-preemptive scheduling.
- (iii) The fastest memory unit present in a computer system is
 - (a) CPU Registers
 - (b) Cache Memory
 - (c) ROM
 - (d) Hard Disk.
- (iv) Context switching is part of
 - (a) Interrupt servicing
 - (b) Interrupt handling
 - (c) Polling
 - (d) Spooling.
- (v) Which of the following refers to the associative memory?
 - (a) the address of the data is generated by the CPU
 - (b) the address of the data is supplied by the users
 - (c) there is no need for an address i.e. the data is used as an address
 - (d) the data are accessed sequentially.
- (vi) Fork is
 - (a) the dispatching of a task
 - (b) the creation of a new process
 - (c) the creation of a new job
 - (d) increasing the priority of a task.

- (vii) Thrashing
(a) is a natural consequence of virtual memory systems
(b) can always be avoided by swapping
(c) always occurs on large computers
(d) can be caused by poor paging algorithms.
- (viii) RAID improves
(a) reliability of storage
(b) degree of multiprogramming
(c) speed of computation
(d) deadlock handling capability of the system.
- (ix) Semaphore is a/an _____ to solve the critical section problem.
(a) hardware for a system (b) special program for a system
(c) integer variable (d) None of these.
- (x) The main disadvantage of spinlocks is that
(a) they are not sufficient for many process
(b) they require busy waiting
(c) they are unreliable sometimes
(d) they are too complex for programmers.

Group – B

2. (a) “It is better to have distinct layers in an operating system to enhance security” – Justify.
(b) Compare Hard and Soft Realtime Systems.
(c) What should be the major strengths of a multimedia system and an embedded system?
 $3 + 3 + (3 + 3) = 12$
3. (a) “Thread is called light weight process” – Justify.
(b) With proper code example explain the difference between Zombie and Orphan process.
(c) What is cascaded termination of processes? When it happens?
 $3 + 5 + (2 + 2) = 12$

Group – C

4. (a) What is convoy effect? Which scheduling algorithm is affected with it?
(b) “Selection of quantum time is the most important to determine efficiency of RR scheduling” – Justify.
(c) Consider the following table of arrival time and burst time for three processes P0, P1 and P2.
- | Process | Arrival time | Burst Time |
|---------|--------------|------------|
| P0 | 0 ms | 9 ms |
| P1 | 1 ms | 4 ms |
| P2 | 2 ms | 9 ms |

The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time and turn-around time for the three processes?

$$(2 + 1) + 3 + 6 = 12$$

5. (a) Discuss Lamport Bakery Algorithm. Why this is special?
(b) What are the different approaches to address deadlock? Explain in brief.

$$6 + 6 = 12$$

Group – D

6. (a) What are the different types of fragmentation? Explain them.
(b) What are the different ways to handle fragmentation?
(c) Explain inverted page table architecture with diagram.

$$4 + 3 + 5 = 12$$

7. (a) Given page reference string:
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm, considering that the system is having 4 frames.
(b) Explain the difference between SCAN and LOOK disk scheduling using an example.

$$(3 \times 3) + 3 = 12$$

Group – E

8. (a) Explain the different block allocation methods followed to store files in secondary storage devices with example.
(b) What is the difference between virus and worm in terms of threats to computer systems?

$$9 + 3 = 12$$

9. (a) Explain PC bus structure with proper block diagram.
(b) Differentiate between interrupt and polling.
(c) What is DMA?

$$5 + 4 + 3 = 12$$

Department & Section	Submission Link
IT	https://classroom.google.com/c/MjgyNjAwNjI2NzQ0/a/MjgyNjAyODM5Njk5/details