

Code: 9F00204**MCA II Semester Supplementary Examinations May/June 2019****OPERATING SYSTEMS**

(For 2009, 2010, 2011, 2012 (LC), 2013, 2014, 2015 & 2016 admitted batches only)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Discuss the various architecture used in organizing the computer-system in detail.
(b) Explain the different services that an operating system provides.
(c) What are system calls? Briefly explain various types of systems calls.
- 2 (a) Discuss the three common ways of establishing relationship between user and kernel threads.
(b) With a neat diagram, explain components of PCB.
(c) Consider the following set of processes, with the length of the CPU burst given in milliseconds. The processes are assumed to have arrived in the order P1, P2, P3 all at time 0.

Process	Burst time
P1-----	24
P2-----	3
P3-----	3

Draw Gantt charts and find the average turnaround time and waiting time for the jobs using FCFS and RR (time quantum = 4 milliseconds) scheduling algorithms.
- 3 (a) What do you mean by a binary semaphore and a counting semaphore? Along with the necessary 'C' struct, explain the implementation of wait () and signal () semaphore operations.
(b) Define mutual exclusion and critical section. Write the software solution for two process synchronization.
- 4 (a) Discuss the steps involved in handling page faults with diagram.
(b) Explain in detail LRU page replacement algorithms with an example.
(c) Consider the page reference string: 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5.
How many page faults would occur for the following replacement algorithms, assuming four frames?
(i) LRU replacement. (ii) FIFO replacement. (iii) Optimal replacement.
- 5 (a) Discuss file allocation concepts with neat diagrams.
(b) Explain file free-space management with neat sketch.
(c) List out the different file directory structure, file allocation methods and do the comparison analysis.
- 6 (a) Explain storage area network with diagram.
(b) List out disk scheduling algorithms and explain any one with diagram.
(c) Explain tertiary storage structure.

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- 7 (a) What are the necessary conditions for deadlocks? Explain the concept of deadlock prevention.
- (b) Consider the following snap shot of a system. It has 4 resource types with instances $\langle 6, 4, 4, 2 \rangle$ and supports five processes. Answer the following questions using Banker's algorithm.
- (i) What is the content of the Need matrix?
- (ii) What is the content of available matrix?
- (iii) Is the system in a safe state? If yes, then write the safe sequence.
- (iv) If a request from process P2 arrives for $\langle 0, 1, 2, 0 \rangle$, can it be immediately granted. Will the system be in safe state?

	Allocation				Max			
	A	B	C	D	A	B	C	D
P1	2	0	1	0	3	2	1	1
P2	1	1	0	0	1	2	2	2
P3	1	1	0	0	1	1	2	0
P4	1	0	1	0	3	2	1	0
P5	0	1	0	1	2	1	0	1

- 8 (a) What is the difference between security and protection. Explain security and protection mechanisms in Linux and windows.
- (b) How capabilities are protected? Explain language based protection.
