

2015

MCA

3rd SEMESTER EXAMINATION

OPERATING SYSTEM

PAPER—MCA-305

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer Q. No. 1 and any four from the rest.

1. Answer any *five* questions : 5×2
- (a) What are the pieces of information associated with a PCB ?
 - (b) Define pre-emptive scheduling with an example.
 - (c) State the basic difference between *caching* and *buffering*.
 - (d) Explain *spinlock*.
 - (e) How do you prevent "circular wait" condition in deadlock ?
 - (f) Explain '50-percent rule' in fragmentation.

(Turn Over)

- (g) Why Optimal Page Replacement algorithm is practically difficult to implement ?
2. (a) Define long-term scheduler and short-term scheduler. 4
- (b) Draw and explain the state diagram of a process. 5
- (c) What are the different types of message-passing systems for inter-process communication? What is *Blocking Send Synchronization mechanism* for message passing among processes ? 2+2
- (d) Explain *cascading termination*. 2
3. (a) What is Turnaround time ? 2
- (b) Why SJF algorithm is a special case of general priority scheduling algorithm ? 2
- (c) How can the next CPU burst time be predicted in SJF algorithm ? 3
- (d) Compute average waiting time and average turnaround time for SJF and FCFS scheduling algorithms using the following information : 4+4

<i>Process</i>	<i>Arrival time</i>	<i>Burst time</i>	<i>Priority</i>
A	0	3	3
B	1	6	5
C	2	1	2
D	3	4	1
E	4	2	4

4. (a) Illustrate with appropriate function the Peterson's solution for process synchronization. What is the limitation of this solution? 4+1
- (b) What is *first readers-writers problem*? Explain with appropriate functions. 2+6
- (c) Explain *race condition*. 2
5. (a) What are the necessary conditions for deadlock? 3
- (b) Define the following : resource allocation graph, safe state. 2+2
- (c) Consider the following snapshot of a system :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

- (i) Is the system in a safe state? 4
- (ii) What is the content of the matrix '*Need*'? 2
- (iii) If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately? 2
6. (a) Explain *worst fit* dynamic allocation strategy with an example. 2+1
- (b) Consider the following page-reference string :
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
How many page fault occurs (assuming 3 frames) in LRU and Optimal Page Replacement? 4+4

- (c) What are the differences between paging and segmentation? 2
- (d) Explain a way of implementing LRU page replacement algorithm. 2
8. Write short notes (any *five*) :
- (a) Semaphore ;
 - (b) Inverted page table ;
 - (c) Thrashing ;
 - (d) C-SCAN disk scheduling ;
 - (e) Linked allocation strategy for file allocation ;
 - (f) DMA ;
 - (g) Spooling ;
 - (h) Polling.

Internal Assessment — 30
