

**MCA (Revised)**

**Term-End Examination**

**June, 2015**

08963

**MCS-041 : OPERATING SYSTEMS**

*Time : 3 hours*

*Maximum Marks : 100*

*(Weightage 75%)*

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**Note :** *Question no. 1 is compulsory. Attempt any three questions from the rest.*

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1. (a) What are the necessary conditions to hold a deadlock in a system ? Explain the Resource Allocation Graph algorithm to deal with deadlock problem. What are the limitations of this approach ? 10
- (b) Consider the set of processes in the given table and the following scheduling algorithms :
- (i) FCFS
  - (ii) Shortest Remaining Time First
  - (iii) Round Robin (quantum = 2)

Process id	Arrival Time	Execution Time
A	0	4
B	2	7
C	3	3
D	4	2
E	6	5

Draw the Gantt chart and find the average waiting time and average turnaround time for all the above algorithms. Comment on your result. Which one is better and why? 10

(c) What is a critical section problem? List the constraints Dijkstra placed on solutions to the critical section problem. 10

(d) Consider the following reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following algorithms, assuming three, five and six frames? 10

- (i) LRU Replacement
- (ii) Optimal Replacement

Remember all frames are initially empty, so first unique pages will all cost one fault each.

2. (a) Describe the following methods for allocating disk space : 10
- (i) Linked Allocation
  - (ii) Contiguous Allocation
- (b) Explain the memory management of Windows 2000 OS. 10
3. (a) Explain the following with respect to IPC : 10
- (i) Synchronous and Asynchronous Communication
  - (ii) Need of Buffering and its implementation
- (b) Define paging with the help of a diagram. Explain the principles of operation of paging. Also discuss about the H/W support for paging. 10
4. (a) Differentiate between user thread and kernel thread. What is thread cancellation ? Explain its type. Also explain the various thread models with their relative advantages and disadvantages. 10
- (b) Differentiate between the following :  $2 \times 5 = 10$
- (i) I/O bound job and CPU bound job
  - (ii) Multiprocessor scheduling and Uniprocessor scheduling

5. (a) Write short notes on the following :  $2 \times 5 = 10$

(i) Temporal and spatial locality of reference

(ii) Memory protection mechanisms

(b) Give an example to explain Lamport's Bakery algorithm in a distributed operating system environment. 10

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