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# MCS-041

## M. C. A. (REVISED)

## Term-End Examination

## December, 2019

### MCS-041 : OPERATING SYSTEMS

*Time : 3 Hours* *Maximum Marks : 100*

*Weightage : 75%*

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***Note :*** *Question No. 1 is compulsory. Answer any* ***three*** *from the rest.*

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1. (a) What do you understand by concurrent processes ? Write and explain semaphores solution for Reader and Writer's problem. 10

   (b) Explain the process and thread management in Windows 2000 O/S. 10

   (c) What are the various types of schedulers used in an OS ? List and explain different scheduling criteria. 10

(d) Consider the following page reference string : 10

1, 2, 3, 2, 2, 3, 3, 4, 5, 6, 1, 1, 2, 3, 2, 1, 4

How many page faults would occur for the following algorithm, assuming 3 frames ?

(i) FIFO

(ii) LRU

(iii) Optimal Algorithm

2. (a) Define Virtual Memory, with the help of a diagram. Explain the virtual to physical address mapping-procedure. 10

(b) Explain an Access-Matrix model of security mechanism with an example. 5

(c) With the help of a diagram, explain Chained Allocation Scheme of non-contiguous storage schemes. 5

3. (a) What is thrashing ? Explain the working set model to avoid thrashing. 10

(b) With the help of a layered structure diagram of UNIX O/S, explain the following : 10

(i) The Kernel

(ii) The Shell

(iii) System Utilities

4. (a) With the help of a diagram, explain the following distributed system models : 10

(i) Distributed objects

(ii) Distributed shared memory

(b) Explain multilevels, acyclic graph and general graph directory structure. 10

5. (a) With reference to synchronization in multiprocessors, explain briefly the following : 10

   (i) Test and Set instruction

   (ii) Compare and Swap instruction

   (iii) Fetch and Add instruction

   (b) What is deadlock avoidance ? Explain the Banker's algorithm for deadlock avoidance with the help of an example. 10