No. of Printed Pages : 4

MCS-041

04625

MCA (Revised)
Term-End Examination
December, 2016

MCS-041 : OPERATING SYSTEMS

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

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

1. (a) A system contains 10 units of resource R1. The resource allocation scenario of 3 user processes P1, P2 and P3 are as below :

	P1	P2	P3
Maximum Requirement	6	5	4
Current Allocation	4	3	2

Is the current allocation state feasible and safe ? Apply Banker's algorithm to check it. If a new request of (2, 1, 0) arises, check whether it will be granted or not using Banker's algorithm. *10*

(b) Explain Bell and LaPadula model for security and protection. Why is security a crucial issue in a distributed OS environment ? *10*

(c) Compare and contrast sharing of segment with sharing of pages. Explain the concept of page faults with an example. *10*

(d) Explain the structure of UNIX operating system and its components in brief. *10*

2. (a) Identify the different states a live process may occupy and show how a process moves between these states. *8*

(b) What are the race conditions ? How do race conditions occur in an operating system ? *6*

(c) Explain file processing in UNIX. Compare it with Windows file processing. *6*

3. (a) What are the problems that arise with absolute addresses in terms of memory swapping ? *5*

(b) With the help of diagrams, explain the concept of demand paging and demand segmentation. *5*

(c) For the page reference string as

0, 2, 4, 2, 1, 9, 4, 3, 5, 7, 4, 5, 7, 8, 6, 3, 0, 2, 1 and with 3 memory frames, calculate the number of page faults using :

(i) OPT

(ii) LRU

Page Replacement algorithms. Compare the result obtained from both the algorithms. *10*

4. (a) Explain the role of Access Lists. *4*

(b) What do you understand by disk scheduling ? Calculate the total head movement with FCFS, SSTF and SCAN disk scheduling algorithms for the given block sequence :

40, 66, 73, 146, 34, 59, 76, 123, 39, 83, 91, 14

Initially the head is at block number 1. Draw the diagram for all the algorithms. *10*

(c) Define mutual exclusion in distributed systems. Also write and explain the Ricart and Agrawala's mutual exclusion algorithm in distributed systems. *6*

5. (a) Explain any two security models for a computer system. *10*

(b) What is a Remote Procedure Call (RPC) ? Explain with example how it works. *10*