Fifth Semester B.E. Degree Examination, June/July 2016
Operating Systems

Time: 3 hrs.
Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. List and explain the functions and services of an operating system and OS operations.
(08 Marks)

    b. What are virtual machines? Explain VM-WARE architecture with a neat diagram. **(08 Marks)**

    c. Differentiate between multiprogramming, multiprocessing and multitasking systems.
(04 Marks)

2   a. Explain process states with state transition diagram. Also explain PCB with a neat diagram.
(08 Marks)

    b. What is IPC? Explain Direct and Indirect communication with respect to message passing systems.
(05 Marks)

    c. Consider the following set of process with arrival time and Burst time.
A LARGER priority number has a higher priority

Jobs	Arrival Time ms	Burst Time ms	Priority
J_1	0	6	4
J_2	3	5	2
J_3	3	3	6
J_4	5	5	3

Draw the Gantt chart and calculate waiting time and turnaround time using
i) FCFS   ii) Pre emptive priority scheduling algorithm.
(07 Marks)

3   a. What are semaphores? Explain Binary and counting semaphores with an example. **(05 Marks)**

    b. What do you mean by RACE? Explain Readers – writer's problem with semaphore in detail.
(08 Marks)

    c. What are monitors? Explain with a neat diagram how monitors are used to solve bounded buffer problem.
(07 Marks)

4   a. What is a dead lock? What are necessary conditions an OS must satisfy for a deadlock to occur?
(05 Marks)

    b. What are the different methods to handle deadlocks? Also explain Deadlock prevention and deadlock avoidance.
(06 Marks)

    c. For the following snapshot. Find the safe sequence using Banker's algorithm.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

i) Is the system in safe state?
ii) If a request from process P_2 arrives for (002), can the request be granted immediately?
(09 Marks)

PART – B

5 a. What are Translation load aside buffers (TLB)? Explain TLB in detail with a simple paging system with a neat diagram. **(08 Marks)**
  b. Given the memory partitions of 100K, 500K, 200K, 300K, and 600K apply First fit and Best fit algorithm to place 212K, 417K, 112K, 426K. **(04 Marks)**
  c. Consider the following page reference string 70120304230321201701 for a memory with three (03) Frames. How many page Faults occur for LRU and FIFO page replacement algorithms? Which is efficient among both? **(08 Marks)**

6 a. What is a file? Explain in detail different allocation methods. **(08 Marks)**
  b. What are directories? List different types of directory structures with examples. Mention their advantages and disadvantages. **(08 Marks)**
  c. Explain how free space is managed. **(04 Marks)**

7 a. Let a disk drive has 5000 cylinders from 0 to 4999. Currently drive is at 143rd cylinder, and the previous request was at cylinder 125. Queue of pending request in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms from current position i) FCFS ii) SCAN iii) LOOK. **(12 Marks)**
  b. What is protection? Distinguish between mechanism and policies. Explain briefly Access matrix with domains as objects. **(08 Marks)**

8 a. With a neat diagram explain in detail components of a Linux system. **(07 Marks)**
  b. Explain the different IPC mechanisms available in Linux in detail. **(08 Marks)**
  c. Explain process scheduling and kernel synchronization in detail. **(05 Marks)**

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