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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Second Semester - Master of Computer Applications (MCA)
Semester End Examination; June/July - 2015
Operating Systems

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

1. a. Discuss the necessities of an operating system with respect to user and system view. 4
- b. Explain the following: 10
 - i) Symmetric and asymmetric multiprocessor.
 - ii) Clustered and distributed systems.
- c. Mention the different system structures employed in an operating systems. Explain the layered approach in detail. 6
2. a. What do you mean by an operating system? Explain the various services provided by an operating system. 8
- b. How does computer system provides hardware support to differentiate various modes of execution? 4
- c. Define system call. List and explain different types of system calls. 8

UNIT - II

3. a. What is a process? How a process is represented in an operating system? Explain. 6
- b. Explain the various states of a process with diagram. 6
- c. What is scheduler? Discuss the need for it in operating system with different types of schedulers. 8
4. a. Explain Interprocess communication in detail. 10
- b. Consider the following set of process, with the length of the CPU burst given in the milliseconds. Draw the Gantt chart and find the average waiting time for the following algorithms. Assume that all the processes have arrived to the queue at the same time (OMS).
 - i) FCFS
 - ii) SJF (Non – Preemptive)
 - iii) Priority (Non – Preemptive)
 - iv) R.R. (Q = 4 ms)

Process	Burst time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

10

UNIT - III

- 5 a. What is critical section? What are the requirements of a solution to the critical section problem? 5
- b. What is semaphore? Give the syntax of wait() and signal() operations. 5
- c. List different types of classical synchronization problems. Explain any two. 10
- 6 a. What are the necessary conditions for the deadlock to occur in a system? 4
- b. Explain resource allocation graph in detail. 6
- c. Consider the following snapshot of a system:

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

Answer the following questions using the Banker’s Algorithm.

- i) What is the content of the matrix need? ii) Is the system in a safe state?

UNIT - IV

- 7 a. Brief first fit, best fit, worst fit concept with an example. 6
- b. What do you mean by page fault? What are actions taken by an O.S. when a page fault occurs? 8
- c. Explain paging hardware with translation Look Asise Buffer. 6
- 8 a. What is fragmentation? Explain its types with example. 5
- b. What is Thrashing? Give the cause for Thrashing. 5
- c. For the following reference string:
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0,1 10
Evaluate how many page faults occurs for FIFO, LRU and optimal techniques for ‘3’ frames.

UNIT - V

- 9 a. List and explain different types of file allocation methods. 12
- b. Briefly write the different file attributes. 4
- c. Mention the different operations in a file system. 4
- 10 a. Using a disk queue with requests for blocks on cylinder: 98, 183, 37, 122, 14, 124, 65, and 67 in the order. Assuming initial disk head position at cylinder 53. Find the number of head movements using the following: 10
- i) FCFS ii) SSTF iii) SCAN and compare the results.
- b. Discuss two – level and tree – structured directories. 10