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Exam. Code: 0931
Sub. Code: 6929

1128
B.E. (Electronics and Communication Engineering)
Seventh Semester
Departmental Elective – III
EC-711: Operating Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. VII (Section-C) which is compulsory and selecting two questions each from Section A-B.

x-x-x

SECTION-A

- 1)
- a) What are the various services provided by an operating system? What is a microkernel and how does it differ from a monolithic kernel?
 - b) Differentiate among multiprogramming, multiprocessing, and real-time Operating Systems. (5, 5)
- 2)
- a) Draw a diagram showing the states a process (or thread) goes through. Show and briefly describe the transitions between the states.
 - b) Given the following processes, arrival times and burst times, draw the Gantt chart showing schedules using the (i) First come, first served, no pre-emption, (ii) Shortest job first, no pre-emption, and (iii) Shortest job first, with pre-emption (if the current process has the shortest equal time then do not preempt it) algorithms. In each case also calculate the average waiting time.

Process	arrival time	burst time
P1	0	5
P2	1	3
P3	5	2
P4	6	1

(5, 5)

- 3)
- a) What are the aspects of memory management? State any 3 differences with explanation between paging and segmentation.
 - b) When a page of memory is accessed but not found in physical memory, a frame must be found for it to be stored in. Different page replacement algorithms and different numbers of frames give different results. Given this reference string of memory requests 1, 2, 3, 4, 1, 5, 2, 4, 1, show the contents of memory, using the algorithms: (i) With the First in First Out selection algorithm and 3 frames and (ii) With the Least Recently Used selection algorithm and 4 frames. (4, 6)

SECTION-B

- 4)
- a) List eight file attributes that could be stored in a file system for each file in a typical multi-user operating system.
 - b) Describe the main steps a file system performs when a process opens a file. (5, 5)
- 5) A disk has 200 cylinders. The head is currently over cylinder 20 heading outwards higher numbered cylinders. A time $t=0$ we have a queue of requests for blocks on different cylinders: 25, 36, 28, 124, 56, 18, 178, and 236. List the order in which the cylinders will be visited using:
- a) SCAN
 - b) C-Look
 - c) If we assume moving X cylinders required X units of time, then how long will it take to visit all cylinders using SSTF (10)

- 6)
- a) Highlight the features of an IOS as a mobile operating system.
 - b) What are the conditions that characterize deadlock? Explain the occurrence and avoidance of deadlock graphically among 3 processes and 3 resources. Discuss Banker's algorithm for deadlock avoidance. (4, 6)

SECTION-C (Compulsory Question)

- 7)
- a) Explain the difference between a program and a process?
 - b) What do you mean by busy form of waiting? What other kinds of waiting are there in an Operating System?
 - c) Computer systems now provide memory protection. What could go wrong if there was no memory protection of the operating system code?
 - d) What are the main differences and similarities between a suspended process and a process waiting for a resource?
 - e) What is disk formatting? (5x2=10)

x-x-x		