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322456(22)

BE (4th Semester)
Examination, April-May, 2018

(New Scheme)

Operating System

Time Allowed : 3 hours *Maximum Marks :* 80
Minimum Pass Marks : 28

Note : (*i*) Part (*a*) of each question is compulsory. Attempt any **two** parts from (*b*), (*c*) and (*d*) of each question.

(*ii*) The figures in the right-hand margin indicate marks.

Unit-I

1. (*a*) Define kernel. [2]

(*b*) What are the system components of an operating system? Explain in detail. [7]

(*c*) What are the functions of an operating system? Explain in brief. [7]

(*d*) What are the different operating system services? [7]

Unit-II

2. (*a*) What is Process Control Block? [2]

(*b*) Describe the Process Life Cycle in detail. [7]

(*c*) Describe the *n*-process solution of critical section problem. [7]

(*d*) For the following table draw a chart illustrating their execution using : [7]

(*i*) First come first serve

(*ii*) Shortest Remaining Time Next

(*iii*) Round Robin (quantum time = 2 ms)

Process	Arrival Time	Processing Time
P_0	0.0	3
P_1	1.0	6
P_2	4.0	4
P_3	6.0	2

Unit-III

3. (*a*) What is resource allocation graph? [2]

(*b*) Explain how the deadlock can be prevented. [7]

(*c*) Consider a system with 5 processes P_0 through P_4 and three resource types *A*, *B* and *C*, resource type *A* has 7 instances, *B* has 2 instances, *C* has 6 instances. Suppose at t_0 time we have the following state :

Process	Allocation			Request			Available		
	A	*B*	*C*	*A*	*B*	*C*	*A*	*B*	*C*
P_0	0	1	0	0	0	0	0	0	0
P_1	2	0	0	2	0	2			
P_2	3	0	3	0	0	0			
P_3	2	1	1	1	0	0			
P_4	0	0	2	0	0	2			

(*i*) Is the given system in deadlock?

(*ii*) Suppose P_2 makes an additional request (0.0,1). What will be the effect of this request to the system? [7]

(*d*) Prove that for deadlock all the processes will be in unsafe state. [7]

Unit-IV

4. (*a*) Define Resident Monitor. [2]

(*b*) Explain the address translation from logical to physical address.

(*c*) Consider the following segment table :

Segment	Base	Limit
0	219	600
1	2300	14
2	100	100
3	1500	580
4	1000	96

[7]

What are the physical addresses for the following logical address? [7]

(*i*) 0430 (*ii*) 110 (*iii*) 2500

(*iv*) 3400 (*v*) 4112

(*d*) If the contents of reference using is : 7,0,1,2,0,3,0,4,2,3,0,3 and there are three frames available in the memory, then compare the performance of given algorithm in terms of page fault : [7]

(*i*) First come first serve

(*ii*) Optimal page replacement

(*iii*) Least recently used

Unit-V

5. (*a*) Define the structure of Input/Output System. [2]

(*b*) Differentiate between program driven and interrupt driven input/output. [7]

(*c*) A certain moving arm disk storage device has the following :

No. of tracks per surface = 404

Track storage capacity = 13030

Disk speed = 3600 rpm

Average seek time = 30 ms

Find the average latency time, disk storage capacity and the rate of data transfer. [7]

(*d*) Suppose the moving head disk with 200 tracks is currently serving a request for track 143 and just finished a request for track 125. If the queue of request is kept in FIFO order : 86, 147, 91, 177, 94, 150; what is the total head movement for the following scheduling schemes ? [7]

(*i*) FCFS

(*ii*) SSTF

(*iii*) C-SCAN