

5E5105**5E5105****B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017****Computer Science & Engineering****5CS5A Operating Systems****CS, IT****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates :**

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Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) What is operating system? Explain its types and services provided by operating system in detail. (8)
- b) Explain the architecture of operating system with neat and clean diagram. (8)

OR

1. a) What you mean by process and lifecycle of process. Explain context switching between two processes. (8)
- b) What you mean by thread? Explain kernel and user level thread. (8)

Unit - II

2. a) What you mean by scheduling? Why scheduling is required? Differentiate the Preemption & Non-Preemption Scheduling? (8)
- b) Write short notes on the following : (2 × 4 = 8)
- i) Fair share scheduling
 - ii) Race condition
 - iii) Critical section
 - iv) Semaphore and mutex

2. Consider the following four processes, with the length of the CPU burst time given in milliseconds. (16)

Process	Burst time (ms)	Arrival time (ms)
P0	15	0.0
P1	20	1.0
P2	3	2.0
P3	7	2.0

Consider the Shortest Remaining Time First (SRTF), Round Robin (RR) (Quantum = 5ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time?

Unit - III **rtuonline.com**

3. a) What is deadlock? Explain the conditions and prevention of deadlock? (4)
- b) What is deadlock avoidance? Explain banker's algorithm with following SNAPSHOT of a system? Resource A = 3, B = 14, C = 12 and D = 12 instances. If P1 request 1 0 2 1 resource instance It can be granted or not?(12)

Allocation					Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

OR

3. a) What is memory allocation schemes? Explain with example. (8)
- b) What is thrashing? What do you understand by degree of multiprogramming.(8)

Unit - IV

4. a) What you mean by paging? Explain the concept of demand paging with proper diagram. (8)
- b) What is fragmentation? Differentiate between external and internal fragmentation. (8)

OR

4. Explain the FIFO, Optimal, LRU page replacement algorithm for the reference string. (16)

- ✓ 5. a) Explain various disk scheduling algorithm in brief. (8)
- b) What are the various access methods for file system. (8)

OR

5. What do you mean by disk scheduling? Suppose the head of moving head disk is currently servicing a request at track 60. If the queue of request is kept in FIFO order. What is the total head movement to satisfy these requests for the following disk scheduling algorithm: (16)

- i) FCFS
- ii) SCAN
- iii) C-SCAN

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REQUEST SEQUENCE	TRACK NUMBER
1	55
2	175
3	30
4	125
5	10
6	140

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UNIT - II

- 2 (a) Describe the solution of Dining-Philosophers problem. 8
- (b) Consider the following set of processes with arrival time and CPU burst time given in ms.

Process	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

What is the average waiting time for these processes with preemptive SJF scheduling ?

8

OR

- 2 (a) What do you understand by Semaphores ? Can it be useful to solve reader-writer problem ? Explain. 8
- (b) What are different algorithmic solutions of Critical Section problem ? Explain. 8

UNIT - III

- 3 (a) What is deadlock ? What are necessary conditions for deadlock to occur ? 8
- (b) Consider the following snapshot of system. The given jobs are of memory size 13 kB, 5 kB only.

Address	Size of Free space
005	2
070	28
105	12
279	82
395	15

Compare best fit, worst fit and first fit memory allocation schemes. Show the allocated addresses and free spaces after every job for all 3 schemes.

8

OR

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[P.T.O.

- 3 (a) Write and explain Bankers algorithm for deadlock avoidance ? 8
(b) Explain difference between Internal and External fragmentation. 8

UNIT - IV

- 4 (a) What do you understand by Belady's Anamoly ? Explain. 8
(b) Consider 3 pages frames and following reference string use FIFO page replacement algo to calculate the number of page faults in each reference string is :
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1 8

OR

- 4 Explain the following :
(i) Demand Paging
(ii) Segmentation with Paging scheme
(iii) Thrashing
(iv) Global versus local allocation.

4×4=16

UNIT - V

- 5 (a) Explain the classification of Allocation Methods. 8
(b) Explain the concept of spooling with all its types and its advantage and disadvantage. 8

OR

- 5 Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is initially at cylinder 53. The queue with request of I/O to blocks in cylinder 98, 183, 37, 122, 14, 124, 65, 67
Count the total head movement of cylinders in SCAN and C SCAN scheduling. 16