B.Tech Odd Semester (CBCS) Exam., December—2016

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

(7th Semester)

Course No. : ETC–704 A

(Operating System)

Full Marks : 75
Pass Marks : 30

Time : 3 hours

Note :
1. Attempt **one** question from each Unit.
2. Begin each answer in a new page.
3. Answer parts of a question at a place.
4. Assume reasonable data wherever required.
5. The figures in the right margin indicate full marks for the questions.

UNIT—I

1. *(a)* What is operating system? Describe different types of operating system with example. 1+5=6

(b) What are different tasks performed by an operating system? 4

(c) Explain the content of process control block in detail. 5

2. *(a)* What is process? Draw the state diagram of a process and briefly elaborate every state of process. 1+4=5

(b) What do you mean by scheduler? Explain different types of scheduler. 1+6=7

(c) Explain CPU scheduling criteria. 3

UNIT—II

3. *(a)* For the process listed in the table below, draw a chart illustrating their execution using FCFS, preemptive and non-preemptive versions of SJF, round robin (quantum = 2) and calculate average turnaround time and average waiting time : 12

Process	*Arrival Time*	*Processing time*
*P*1	0	8
*P*2	1	4
*P*3	2	9
*P*4	3	5

(b) What are the disadvantages of FCFS scheduling algorithm as compare to shortest job first (SJF) scheduling? 3

4. *(a)* What is thread? Why is it called light weight process? Write two advantages of kernel level thread over user level thread. 1+2+2=5

(b) What is critical section problem? What are the requirements, a critical section problem must satisfy? 1+3=4

(c) State producer-consumer problem. Give a solution to the producer-consumer problem using semaphore. Justify your solution guarantees mutual exclusion. 1+3+2=6

UNIT—III

5. *(a)* What is deadlock? What are the necessary conditions for the occurrence of a deadlock? 1+4=5

(b) Write the Banker's algorithm and explain it in detail. 6

(c) Describe the deadlock detection algorithm for a multiple instances of each resource type. 4

6. Consider the following system snapshot using data structures in the Banker's algorithm with resources *A*, *B*, *C* and *D* and process *P*0 to *P*4 :

	MAX				*ALLOCATION*				*AVAILABLE*			
	A	*B*	*C*	*D*	*A*	*B*	*C*	*D*	*A*	*B*	*C*	*D*
*P*0	6	0	1	2	4	0	0	1	3	2	1	1
*P*1	1	7	5	0	1	1	0	0				
*P*2	2	3	5	6	1	2	5	4				
*P*3	1	6	5	3	0	6	3	3				
*P*4	1	6	5	6	0	2	1	2				

Using Banker's algorithm, answer the following questions : 2+3+4+6=15

(a) How many resources of type *A*, *B*, *C* and *D* are there?

(b) What are the contents of the need matrix?

(c) Is the system in a safe state? Why?

(d) If a request from process *P*4 arrives for additional resources of (1, 2, 0, 0) then new system state.

UNIT—IV

7. *(a)* What is paging? Differentiate between internal and external fragmentations. What is thrashing? 1+4+1=6

(b) What is TLB? What do you mean by 'Belady's anomaly'? 1+2=3

(c) Having three physical memory frames, show the behavior of LRU and optimal page replacement algorithm for the page address string like

1, 2, 3, 4, 2, 1, 5, 6, 2, 1,
2, 3, 7, 6, 3, 2, 1, 2, 3, 6 6

8. (a) Compare fixed partition allocation strategy with variable partition scheme for contiguous memory allocation. 4

(b) Compare best fit, worst fit and first fit algorithms with example. 6

(c) Why is TLB used in a paging scheme? 5

UNIT—V

9. (a) The head of a moving– head system with 200 tracks numbered from 0 to 99 is currently serving a request at track 53. The queue of request is kept in the FIFO order as 98, 183, 37, 122, 14, 124, 65 and 67. What is the total head movement required to satisfy these request for *(i)* FCFS, *(ii)* SSTF, *(iii)* SCAN and *(iv)* C-SCAN algorithm? 12

(b) What is a record in a file? For a file having multiple records, what are different indexing strategies there? 1+2=3

10. (a) Explain different file access methods in detail. 6

(b) Explain about the RAID structure in disk management with various RAID levels of organization in detail. 9

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