PCET LIBRARY BANGALORE-49

CBCS SCHEME

USN | | | | | | | | | | |

BCS303

Third Semester B.E./B.Tech. Degree Examination, June/July 2026
Operating Systems

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.
3. Draw suitable diagram wherever applicable and assume missing data.

		Module – 1	M	L	C
Q.1	a.	Define Operating System. Explain briefly multiprogramming and time sharing system.	07	L2	CO1
	b.	Differentiate between client server computing and peer to peer computing.	07	L2	CO1
	c.	Write code snippet to implement process system call execu( ).	06	L3	CO1
		OR			
Q.2	a.	Explain the layered approach of operating system structure with a supporting diagram.	07	L2	CO1
	b.	Explain abstract view of components of computer system with a neat diagram.	07	L2	CO1
	c.	Develop a program to implement process system call fork( ) and display its own process id and its child id.	06	L3	CO1
		Module – 2			
Q.3	a.	Draw the Gantt chart and calculate average waiting time and turn around time for the following snapshot of the processes using (i) FCFS (ii) SRTF (iii) RR. (q = 2 ms) Processes | Burst Time ms | Arrival Time ms P_1 | 6 | 0 P_2 | 3 | 1 P_3 | 1 | 2 P_4 | 4 | 3	07	L3	CO2
	b.	What is IPC? Explain direct and indirect communication with respect to message passing.	07	L2	CO2
	c.	What is Multithreaded Process? Explain the four benefits of multithreaded programming.	06	L2	CO2
		OR			
Q.4	a.	Calculate the average waiting time and average turn around time by drawing the Gantt chart using FCFS, SJF – Non Preemptive and Priority algorithm. Processes | Arrival Time | Burst Time | Priority P_1 | 0 | 9 | 3 P_2 | 1 | 4 | 2 P_3 | 2 | 9 | 1 P_4 | 3 | 5 | 4 Lower Number is highest priority.	07	L2	CO1
	b.	What is Process? With a neat diagram explain the states of a process with a transition diagram and process control block.	07	L2	CO2
	c.	Explain scheduler in process execution.	06	L2	CO2
		Module – 3			
Q.5	a.	Show how semaphores provide solution to reader writers problem.	06	L2	CO3

VTU-25-06-2026 09:49:06am - EP - EP - EP

Q.5	b.	Consider following snapshot of the system. Answer is the system in safe state. Give the safe sequence using Banker's Algorithm.	08	L3	CO3
	c.	Explain resource allocation graph (i) with Deadlock (ii) with a cycle but no deadlock.	06	L2	CO3

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	2	0	0	1	4	2	1	2	3	3	2	1
P_1	3	1	2	1	5	2	5	2				
P_2	2	1	0	3	2	3	1	6				
P_3	1	3	1	2	1	4	2	4				
P_4	1	4	3	2	3	6	6	5				

OR

Q.6	a.	Illustrate Peterson solution for critical section problem.	05	L2	CO3
	b.	Using Banker's Algorithm determine whether following system is in safe state. If the request from process P_2 arrives for (002) can the request be granted immediately?	08	L3	CO3
	c.	What is Critical Section? What are the requirements for solution to critical section problem?	07	L2	CO3

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

Module – 4

Q.7	a.	Consider the following page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Assuming there are three memory frames. Determine the page faults occur in case of FIFO, Optimal and LRU replacement algorithm.	08	L3	CO4
	b.	What is Paging? Explain with neat diagram paging hardware with TLB.	08	L2	CO4
	c.	Explain Fragmentation in detail.	04	L2	CO4

OR

Q.8	a.	Discuss the structure of page table with a suitable diagram.	10	L2	CO4
	b.	Illustrate how demand paging affects system performances.	06	L2	CO4
	c.	With the help of neat diagram, explain various steps of address binding.	04	L2	CO4

Module – 5

Q.9	a.	Suppose that a disk has 200 cylinders numbered from 0 to 199. The drive is currently serving a request at cylinder 100 and previous request was at cylinder 125. The request of pending request an FIFO order is 27, 129, 110, 186, 147, 41, 10, 64 and 120 What is total distance that the disk arm moves to satisfy all pending request for each of the following algorithm: FCFS, SSTF, SCAN and CLOOK Algorithm.	08	L3	CO5
	b.	Explain the various access methods of files.	06	L2	CO5
	c.	Explain the access matrix method of system protection, with the domain as object and its implementation.	06	L2	CO6

OR

Q.10	a.	Explain the single level and two level directory with suitable diagram.	08	L2	CO5
	b.	Explain the different file operations implemented in file system.	06	L2	CO5
	c.	Explain goals and principles of protection used to protect modern computer system.	06	L2	CO6