CBCS SCHEME

USN | | | | | | | | | | | | BCS303

Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
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.

		Module – 1	M	L	C
Q.1	a.	Define Operating System. Explain dual mode of OS with a neat diagram.	5	L1, L2	CO1
	b.	Distinguish between the following terms: i) Multiprogramming and Multitasking ii) Multiprocessor system and clustered system.	10	L2	CO1
	c.	With a neat diagram, explain the concept the concept of VM-WARE architecture.	5	L1, L2	CO1
		OR			
Q.2	a.	Explain the operating system services with respect to programs and users.	5	L2	CO1
	b.	List and explain the different computing environments.	5	L1, L2	CO1
	c.	What are system calls? List and explain the different types of system calls.	10	L1, L2	CO1
		Module – 2			
Q.3	a.	Define process. Explain different states of a process with state diagram.	8	L1, L2	CO1
	b.	What is IPC? Explain direct and indirect communication with respect to message passing.	8	L1, L2	CO2
	c.	Explain context-switching.	4	L2	CO2
		OR			
Q.4	a.	What is multi-threaded process? Explain the four benefits of multithreaded programming.	6	L2	CO2
	b.	Calculate the average waiting time and average turn around time by drawing the Gantt-chart using FCFS, SJF-non preemptive, SRTF, RR(q = 2ms) and porosity algorithms.	14	L3	CO2
		Module – 3			
Q.5	a.	What is critical section? What are the requirements for the solution to critical section problem? Explain Peaterson's solution.	8	L1, L2	CO3
	b.	Explain Reader's-Writer's problem using semaphores.	12	L2	CO3

Process	Arrival time	Burst time	Porosity
P1	0	9	3
P2	1	4	2
P3	2	9	1
P4	3	5	4

OR

Q.6	**a.**	What is deadlock? What are the necessary conditions for the deadlock to occur?	**6**	**L1, L2**	**CO3**
	b.	Consider the following snap-shot of a system: Answer the following using Banker's algorithm: i) Is the system in safe state? If so give the safe sequence. ii) If process P2 requests (0, 1, 1, 3) resource can it be granted immediately.	**14**	**L3**	**CO3**

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

Module – 4

Q.7	**a.**	What is paging? Explain with neat diagram paging hardware with TLB?	**10**	**L1, L2**	**CO4**
	b.	What are the commonly used strategies to select a free hole from the available holes?	**6**	**L1**	**CO4**
	c.	Explain fragmentation in detail.	**4**	**L2**	**CO4**

OR

Q.8	**a.**	With a neat diagram? Describe the steps in handling the page fault.	**8**	**L2**	**CO4**
	b.	Consider the page reference string: 1, 0, 7, 1, 0, 2, 1, 2, 3, 0, 3, 2, 4, 0, 3, 6, 2, 1 for a memory with 3 frames. Determine the number of page faults using F1, F0, optimal and LRU replacement algorithms which algorithm is more efficient.	**12**	**L3**	**CO4**

Module – 5

Q.9	**a.**	Define file. List and explain the different file attributes and operations.	**10**	**L1**	**CO5**
	b.	Explain the different allocation methods.	**10**	**L2**	**CO5**

OR

Q.10	**a.**	What is Access Matrix? Explain Access Matrix method of system protection with domain as objects and its implementation.	**10**	**L1, L2**	**CO5**
	b.	A drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request 143 and previously serviced a request at 125. The queue of pending requests in FIFO order is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from current head position. What is the total distance travelled (in cylinders) by disk arm to satisfy the requests using FCFS, SSTF, SCAN, LOOK and C-LOOK algorithm.	**10**	**L3**	**CO5**

* * * * *