Velegapudi Ramakrishna Siddhartha Engineering College::Vijayawada
(Autonomous)

VR20

II /IV B Tech Degree Examinations(November 2021)
Third Semester
Department of Information Technology
20IT3305 : OPERATING SYSTEMS

Time:3Hrs	**MODEL QUESTION PAPER**	Max Marks:70

Part – A is Compulsory
Answer one (01) question from each unit of Part – B
Answers to any single question or its part shall be written at one place only

Cognitive Levels(K): K1-Remember;K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Q. No		**Question**	**Marks**	**Course Outcome**	**Cog. Level**
Part - A			**10X1=10M**		
1	a	What is a system call?	1	CO1	K1
	b	Differentiate between user mode and kernel mode.	1	CO1	K2
	c	List different types of schedulers.	1	CO1	K1
	d	What are mutex locks?	1	CO2	K1
	e	Compare preemptive and non- preemptive scheduling	1	CO2	K2
	f	Specify the techniques to recover from a deadlock.	1	CO3	K1
	g	Differentiate between Best fit and worst fit strategies for memory allocation.	1	CO3	K2
	h	Write the causes for thrashing	1	CO3	K2
	I	List the attributes of a file	1	CO4	K1
	j	Define Latency time and Seek time.	1	CO4	K1
Part - B			**4X15 =60M**		
		UNIT - I			
2	a	List and explain different services provided by Operating System**.**	8	CO1	K2
	b	There are two processes: Producer and Consumer. The producer produces some items and the Consumer consumes that item. The two processes share a common space or memory location known as a buffer where the item produced by the Producer is stored and from which the Consumer consumes the item if needed. Identify the suitable IPC mechanism for the above scenario and explain the process.	7	CO3	K4
		(OR)			
3	a	Differentiate between process and thread. Explain various multithreading models with neat diagrams.	8	CO1	K2
	b	Draw process state diagram. For each of the following transitions between processes states indicate whether the transition is possible. If it is possible, give an example of one thing that would cause it i) Run → Wait ii) Wait → Ready iii) Run →New	7	CO1	K2

		iv) Wait → run v) Run→ready			
UNIT - II					
4	a	Consider the following set of processes, with the length of the CPU-burst time given in milli seconds Process | Arrival Time | Burst time | priority P1 | 0 | 7 | 3 P2 | 1 | 4 | 1 P3 | 2 | 2 | 3 P4 | 3 | 3 | 4 P5 | 4 | 6 | 2 Draw the grant charts illustrating the execution of these processes using FCFS, Preemptive SJF and Non Preemptive Priority scheduling algorithm. Compute average waiting time for each algorithm.	10	CO2	K3
	b	List and explain the criteria for evaluating the performance of scheduling algorithms.	5	CO2	K2
(OR)					
5	a	What is critical section problem and write simple software based solution to critical section problem.	7	CO2	K2
	b	Consider a situation where we have a file shared between many people. If one of the people tries editing the file, no other person should be reading or writing at the same time, otherwise changes will not be visible to him/her. However if some person is reading the file, then others may read it at the same time. Provide Semaphore solution satisfying the conditions specified in the above scenario.	8	CO2	K3
UNIT - III					
6	a	What is deadlock and what are the necessary conditions for the deadlock to occur?	5	CO3	K2
	b	Implement Bankers algorithm for the given resource allocation state. | | Max | Allocation | Available | | | A B C | A B C | A B C | | P_0 | 0 0 1 | 0 0 1 | | | P_1 | 1 7 5 | 1 0 0 | | | P_2 | 2 3 5 | 1 3 5 | | | P_3 | 0 6 5 | 0 6 3 | | | Total | | 2 9 9 | 1 5 2 | • How many resources are there of type (A,B,C)? • What are the contents of the Need matrix? • Is the system in a safe state? Why?	10	CO3	K4

		• Give the safe sequence. • If a request from process P1 arrives for additional resources of (0,5,2), can the Banker's algorithm grant the request immediately? • What would be the new system state after the allocation?			
		(OR)			
7	a	Paging avoids external fragmentation whereas segmentation does not. Justify the statement.	8	CO3	K4
	b	Computer no of page faults for the given reference string using FIFO, Optimal and LRU page replacement algorithm. Analyze the algorithms when the no. of frames are 3, 4, 5 for the reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,4,1,3,5,6	7	CO2	K3
		UNIT - IV			
8	a	Write short notes on the following file allocation methods: Contiguous Allocation Lined Allocation Free Space management Techniques	9	CO4	K2
	b	List and explain any two directory structures with examples	6	CO1	K2
		(OR)			
9	a	Implement FIFO, SSTF, SCAN and C-SCAN disk scheduling algorithms for the given request of tracks in the order 55, 58, 37, 18, 90, 160,150, 38,184	8	CO4	K3
	b	Compare the throughput achieved by a RAID level 5 organization with that achieved by a RAID level 1 organization for the following: a. Read operations on single blocks b. Read operation on multiple contiguous blocks	7	CO1	K2

Designation	Name in Capitals	Signature with Date
Course Coordinator	Dr.T.ANURADHA Dr.K.SITA KUMARI	
Program Coordinator	Dr.G.KALYANI	
Head of the Department	Dr.M.SUNEETHA	