Q. Code:940661

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Third-Semester

CS18402 – OPERATING SYSTEMS

(Computer Science and Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	The Students will be able to infer the OS features and operations while working in operating system.	**2**
CO 2	Students will obtain the skill to Excel expertly in the process scheduling algorithms and inter process communication procedures.	**3**
CO 3	Students will be able to demonstrate the process synchronization and deadlock methods	**2**
CO 4	Students will identify various memory management techniques and analyze the working methodology of each technique	**3**
CO 5	Students will gain the deep knowledge on file system, Disk Management and able to discover the features of different operating systems.	**2**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Define Operating System and mention its functions.	**1**	**1**
2.	What is meant by Privileged Instruction?	**1**	**2**
3.	Sketch the Process Control Block.	**2**	**2**
4.	Differentiate Preemptive and non-preemptive scheduling.	**2**	**2**
5.	What is Priority Inversion and How do you overcome Priority Inversion?	**3**	**2**
6.	What is meant by Race Condition?	**3**	**2**
7.	Discuss about the Logical and the Physical address space.	**4**	**3**
8.	Identify the use of "context switch time".	**4**	**3**

9.	Define Belady's anomaly.	**5**	**2**	
10.	Illustrate the access list privilege for chmod 711.	**5**	**2**	

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	Discuss in detail Interrupts and Analyze the changes in the instruction cycle when an interrupt is involved.		**(14)**	**1**	**2**
	(OR)				
(b)	**(i)**	Explain the various types of system calls with an example for each.	**(7)**	**1**	**2**
	(ii)	Discuss the functionality of system boot with respect to an Operating System.	**(7)**	**1**	**2**
12. (a)	Describe in detail Interprocess Communication using Shared Memory and Message Passing Model.		**(14)**	**2**	**2**
	(OR)				
(b)	Explain in detail about Multithreading models with suitable example.		**(14)**	**2**	**2**
13. (a)	Describe the concept of semaphore for the following synchronization problem and explain with C Code. a. Readers-Writers Problem b. Dining-Philosophers Problem		**(14)**	**3**	**2**
	(OR)				
(b)	Consider the following system snapshot using data structures in the Banker's algorithm with resources A, B, C and D and process P0 to P4:		**(14)**	**4**	**2**

	Max				Allocation				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	6	0	1	2	4	0	0	1	3	2	1	1
P1	1	7	5	0	1	1	0	0				

P2	2	3	5	6	1	2	5	4				
P3	1	6	5	3	0	6	3	3				
P4	1	6	5	6	0	2	1	2				

Using Banker's algorithm, answer the following questions:

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

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

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

(iv) If a request from process P2 arrives for additional resources of (1,2,0,0) can the Banker's algorithm grant the request immediately? Show the new system state and other criteria.

14. (a)	**(i)**	Explain allocation of frames in detail, with suitable Example.	**(7)**	**4**	**3**
	(ii)	What is meant by Thrashing? Discuss in detail.	**(7**	**4**	**3**
		(OR)			
(b)		Given page reference string1,4,5,7,7,8,9,5,4,1,2,1,5,6,4,7,8,3,4,5 Compare the number of page faults for FIFO, LRU and Optimal page replacement algorithms for three, four and five frames.	**(14)**	**4**	**3**
15. (a)		On a disk with 1000 cylinders numbered from 0 to 999, compute the number of tracks the disk arm must move to satisfy the entire request in the disk queue. Assume that the disk arm is at cylinder 345 and the previous request is at cylinder 110. The queue in FIFO order contains requests for the following cylinders 123, 874, 692, 475, 105 and 376. Find the total distance travelled (in cylinders) for the following disk scheduling policies : FCFS, SSTF, SCAN, CSCAN, LOOK, C-LOOK.	**(14)**	**5**	**2**
		(OR)			
(b)	**(i)**	Briefly discuss about the various directory structure.	**(7)**	**5**	**2**
	(ii)	Explain the file allocation methods with neat diagram. Mention their advantages and disadvantages.	**(7)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Analyze the RAID in different levels and which is more suitable for cloud server level applications.	**(10)**	**5**	**5**

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