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

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

Fourth Semester

CS18402 – OPERATING SYSTEMS

(Computer Science and Engineering)

(Regulation 2018/2018A)

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

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

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What are the services of an operating system?	**1**	**1**
2.	Interpret the privilege set to the Bootstrap Loader and its mode.	**1**	**2**
3.	List the various scheduling criteria in CPU scheduling.	**2**	**1**
4.	Explain the different ways in which a thread can be cancelled.	**2**	**2**
5.	Illustrate operation of semaphore with example procedure.	**3**	**3**
6.	Explain Starvation in operating system.	**3**	**2**
7.	Differentiate paging and segmentation.	**4**	**4**
8.	What is Thrashing and explain how to resolve this problem?	**4**	**2**
9.	Illustrate the access list privilege for chmod 741.	**5**	**3**
10.	Enlist different types of directory Structure.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Discuss the various structures of an operating system with a neat sketch?	**(14)**	**1**	**2**
	(OR)			
(b)	Describe in detail about the system calls and system programs with a neat diagram?	**(14)**	**1**	**2**

12. (a)	Illustrate the communication mechanism between processes using inter process communication (IPC)? i) Shared Memory ii) Message Passing	**(14)**	**2**	**3**
	(OR)			
(b)	Consider the set of 5 processes whose arrival time and burst time are given below Illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, Priority, Round Robin(quantum=2)	**(14)**	**2**	**3**

Process Id	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	1	1	1
P3	2	2	3
P4	1	1	4
P5	2	5	2

13. (a)	Outline a solution using synchronization techniques to solve classical problems of synchronization? 1. Bounded Buffer Problem 2. Reader Writer Problem 3. Dining philosopher problem.	**(14)**	**3**	**3**
	(OR)			

(b) **(14) 3 3**

Consider the snapshot of a system.

Process	Max	Allocation	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	

Answer the following Using Banker's algorithm,

(i) Illustrate that the system is in safe state by demonstrating an order in which the processes may complete?

(ii) If a request from process P1 arrives for (1,1,0,0) can the request be granted immediately?

(iii) If the request from p4 arrives for (0,0,2,0) can the request be granted immediately?

14. (a) **(14) 4 3**

Explain in detail the memory management technique with Paging and TLB. With a neat diagram demonstrate how logical address is translated into physical address. Discuss in detail about Segmentation

(OR)

(b) Consider the Pages referenced by the CPU in the order are 6, 7, 8, 9, 6, 7, 1, 6, 7, 8, 9, 1, 7, 9, 6. Justify which replacement algorithm works better for the given reference string. How many page faults would occur for the following replacement algorithms? Solve the problem using 3 Frames and 4 Frames. Justify Belady's Anomaly. **(14) 4 3**

1. FIFO replacement
2. LRU replacement
3. Optimal replacement

15. (a) Illustrate in detail about the concepts of file systems and its access methods, also discuss the allocation methods of directory. **(14) 5 3**

(OR)

(b) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. The drive is currently serving a request at cylinder 50 and the the previous request was at cylinder 45. If the Disk requests are arrived in the order 82,170,43,140,24,16,190. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms? a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN f. C-LOOK **(14) 5 3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Examine how to implement wait() and signal() semaphore operations.	**(10)**	3	**4**

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