

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

18CS654

Sixth Semester B.E. Degree Examination, July/August 2022

Introduction to Operating System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define an Operating System. Explain the role of an operating system from different viewpoints. (06 Marks)
- b. What are the eight major activities of an operating system with regard to process management, memory and mass storage management? (08 Marks)
- c. Describe the services provided by an operating system which are helpful to the user. (06 Marks)

OR

- 2 a. Explain Dual-mode operation with a neat diagram. (04 Marks)
- b. Define simple, layered and micro kernels approach for structuring the operating system along with relevant diagrams. (12 Marks)
- c. Explain the “graceful degradation” and “fault tolerant” in a multiprocessor systems. (04 Marks)

Module-2

- 3 a. What is a process? Describe the different states of a process with a neat diagram. (06 Marks)
- b. Briefly explain co-operating processes and mechanisms of IPC using shared memory and message passing with relevant diagrams. (12 Marks)
- c. Explain the need for context switching between processes. (02 Marks)

OR

- 4 a. What is a thread? Explain the different multi threading models. (06 Marks)
- b. What information is kept in process control block? Explain with a neat diagram. (08 Marks)
- c. Demonstrate the operations of process creation and process termination. (06 Marks)

Module-3

- 5 a. Describe the scheduling criteria that must be kept in mind while choosing different scheduling algorithms. (06 Marks)
- b. Give the differences between short-term, medium-term and long-term scheduling. (06 Marks)
- c. Briefly describe the FCFS and SJF scheduling algorithms with examples. (08 Marks)

OR

- 6 a. Consider the following set of processes, with the length of the cpu burst given in milliseconds.

Process	Burst time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

The processes are assumed to have arrived in the order P₁, P₂, P₃, P₄, P₅ all at time 0. Draw 4 Gantt charts that illustrates the execution of these processes using the following scheduling algorithms: FCFS, SJF non preemptive priority (smaller priority number implies a higher priority) and RR (quantum = 1). What is the average turnaround time and waiting time for each of these scheduling algorithms? (14 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- b. Differentiate the following with examples:
- Preemptive and non-preemptive scheduling.
 - I/O bound and cpu bound
 - Scheduler and dispatcher.

(06 Marks)

Module-4

- 7 a. Define dead lock. Write a note on 4 necessary conditions that arise dead locks. (06 Marks)
- b. Assume that there are 5 processes P_0 through P_4 and 4 types of resources. At time T_0 we have the following state.

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

Apply Bankers algorithm to answer the following:

- What is the content of need matrix?
 - Is the system in a safe state?
 - If a request from a process $P_1(0, 4, 2, 0)$ arrives, can it be granted?
- c. Write a note on "safe state".

(08 Marks)

(06 Marks)

OR

- 8 a. Write short notes on:
- External and Internal fragmentation. (06 Marks)
 - Dynamic loading and linking.
- b. Given memory partitions of 100K, 500K, 200K, 300K and 600K (in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order) which algorithm makes the most efficient use of memory. (06 Marks)
- c. Explain with the help of supporting hardware diagram. How the TLB improves the performance of a demand paging system. (08 Marks)

Module-5

- 9 a. Explain virtual memory and its advantages. (06 Marks)
- b. What is the procedure for handling page fault with a neat block diagram? (08 Marks)
- c. Write a note on copy-on-write. (06 Marks)

OR

- 10 a. What are the typical attributes of a file? (06 Marks)
- b. Define operations that can be performed on files. (06 Marks)
- c. Explain various access methods of files. (08 Marks)

* * * * *