Reg. No.															

Question Paper Code	14254

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Fourth Semester

Computer Science and Engineering

(Common to Information Technology & Computer Science and Engineering (Cyber Security))

20CSPC401 - OPERATING SYSTEMS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is the primary purpose of interrupts in an operating system? (a) To execute system calls (b) To handle errors (c) To handle asynchronous events (d) To manage hardware resources	1	K1	CO1
2.	Which of the following is not an objective of an operating system? (a) To provide a consistent and stable environment. (b) To manage and allocate system resources. (c) To provide an interface between the user and the computer hardware. (d) Perform an application-specific task	1	K1	CO1
3.	What is a process in an operating system? (a) A program in execution (b) A part of the operating system (c) A collection of threads (d) A program stored on disk	1	K1	CO2
4.	Which CPU scheduling algorithm can cause starvation? (a) First-Come, First-Serve (b) Shortest Job First (c) Round Robin (d) Multilevel Queue	1	K1	CO2
5.	Which condition must be eliminated to prevent circular wait? (a) Mutual Exclusion (b) Hold and Wait (c) No Preemption (d) Circular Wait	1	K1	CO3
6.	The 'Wait-for Graph' method is used for _____ (a) Deadlock prevention (b) Deadlock detection (c) Deadlock recovery (d) Process scheduling	1	K1	CO3
7.	What is the purpose of a page table in memory management? (a) To store processes in memory (b) To map logical addresses to physical addresses (c) To allocate CPU time to processes (d) To prevent thrashing	1	K1	CO4
8.	How can thrashing be prevented? (a) By increasing the amount of memory available (b) By decreasing the number of processes running (c) By decreasing the CPU utilization (d) By improving the efficiency of the process scheduler	1	K1	CO4
9.	When should disk formatting be performed? (a) Before installing an operating system (b) After a system crash (c) When the disk is full (d) Periodically for maintenance	1	K1	CO5
10.	Who is the creator of the Linux kernel? (a) Linus Torvalds (b) Richard Stallman (c) Bill Gates (d) Steve Jobs	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define Multiprogramming.	2	K1	CO1
12.	What is interrupt vector and interrupt service routine?	2	K1	CO1
13.	Explain process control block and draw its structure.	2	K2	CO2
14.	Define context switching.	2	K1	CO2
15.	Outline the four necessary conditions for a deadlock to occur.	2	K2	CO3
16.	Explain how does process rollback help in deadlock recovery.	2	K2	CO3

17.	What do you mean by Compaction?	2	K1	CO4
18.	Differentiate Dynamic loading and Dynamic linking.	2	K2	CO4
19.	Summarize the different accessing methods of a file.	2	K2	CO5
20.	Relate how free-space is managed using bit vector implementation.	2	K2	CO5
21.	List the components of SDK framework.	2	K1	CO6
22.	Define Hypervisor.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the different operating system structure and explain with neat sketch.	11	K2	CO1
		OR			
	b)	Interpret about the various system calls used in Operating Systems in detail.	11	K2	CO1
24.	a)	Consider the following set of processes, with the length of the CPU burst time given in milliseconds. Draw the Gantt chart illustrating the execution of these processes using FCFS, SJF (preemptive), RR(time quantum=2), Priority. Calculate the average turnaround time, average waiting time.	11	K3	CO2

Process	Arrival Time	Burst time	Priority
P1	0	10	2
P2	1	6	3
P3	2	12	1
P4	3	15	4

OR

	b)	Identify operation on processes in detail about inter process communication.	11	K3	CO2
25.	a)	Illustrate the snapshot of a system.	11	K2	CO3

	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?

OR

	b)	Explain the four necessary conditions for deadlock. How can each condition be prevented to avoid deadlock in a system?	11	K2	CO3
26.	a)	Consider the following page reference string: 1, 2, 3, 4, 5, 3,4,1,6,7,8,7, 8, 9, 7, 8, 9, 5, 4, 4, 5, 3 How many page faults would occur for the following replacement algorithms, assuming four frames? Remembering all frames are initially empty. (i) LRU replacement. (ii) FIFO replacement. (iii) Optimal replacement.	11	K3	CO4
		OR			
	b)	Utilize the thrashing and apply methods to avoid thrashing.	11	K3	CO4

27.	a)	Explain the concept of FIFO? Suppose that a disk drive has 500 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143. The queue of pending requests in FIFO order 86,140,913,177,948,159, 122, 175, 130 starting from current head position. What is the total distance that disk arm moves to satisfy the entire pending request for FCFS, SCAN and LOOK disk scheduling algorithm?	*11*	*K2*	*CO5*
		OR			
	b)	Describe the components and structure of file system architecture in an operating system.	*11*	*K2*	*CO5*
28.	a)	Illustrate the procedure for setting XEN on LINUX host and adding guest OS.	*11*	*K2*	*CO6*
		OR			
	b)	Explain the step-by-step procedure for setting up a local network services.	*11*	*K2*	*CO6*