Reg. No.															

Question Paper Code	13468

B.E. / B.Tech./ M.Tech - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fourth Semester

Computer Science and Engineering

(Common to Computer Science and Engineering (AIML), Computer Science and Engineering (IOT), Computer Science and Engineering (Cyber Security), Information Technology & M.Tech - Computer Science and Engineering (5 Years Integrated))

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 advantage of using interrupts for handling hardware events in an operating system? (a) Improved system security (b) Reduced CPU overhead (c) Enhanced system stability (d) Faster execution of system calls	*1*	*K1*	*CO1*
2.	Choose the correct one.At system boot time, the hardware starts in _____ (a) Kernel mode (b) User node (c) Both kernel and user mode (d) Never predicted	*1*	*K1*	*CO1*
3.	Which of the following scheduler processes to be executed by the CPU? (a) Long-term scheduler (b) Short-term scheduler (c) Medium-term scheduler (d) Dispatcher	*1*	*K1*	*CO2*
4.	What happens when a parent process terminates before its child process? (a) The child process becomes a zombie process (b) The child process is terminated automatically (c) The child process continues execution as an orphan (d) The child process restarts	*1*	*K1*	*CO2*
5.	Which deadlock condition is removed by allowing preemption of resources? (a) Mutual Exclusion (b) Hold and Wait (c) No Preemption (d) Circular Wait	*1*	*K1*	*CO3*
6.	What happens when a system is in an unsafe state? (a) Deadlock has already occurred (b) Deadlock will definitely occur (c) The system may enter deadlock if resources are allocated incorrectly (d) The system cannot execute any process	*1*	*K1*	*CO3*
7.	In Segmentation, a process address space is broken in varying sized blocks called _____. (a) Sections (b) Pages (c) Blocks (d) None of the mentioned	*1*	*K1*	*CO4*
8.	Choose the correct one. If the process tries to access a page that was not brought into memory, this causes _____. (a) Page hit (b) frame fault (c) hardware fault (d) page fault	*1*	*K1*	*CO4*
9.	Which of the following file attribute Access-control information determines who can do reading, writing, executing, and so on? (a) Protection (b) identifier (c) Type (d) Time, date, and user identification	*1*	*K1*	*CO5*
10.	What is the significance of the Linux kernel? (a) It provides a graphical user interface (b) It manages system resources and hardware communication (c) It stores user data (d) It compiles software programs	*1*	*K1*	*CO6*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define System Call.	2	K1	CO1
12.	What is the difference between device driver and device controller?	2	K1	CO1
13.	Define critical section.	2	K1	CO2
14.	Differentiate co-operating process and independent process.	2	K2	CO2
15.	How does preemption help in deadlock prevention?	2	K2	CO3
16.	What is a resource allocation graph?	2	K1	CO3
17.	Mention the use of Valid-Invalid Bits in Paging.	2	K1	CO4
18.	What is a Reference String?	2	K1	CO4
19.	List the various file attributes.	2	K1	CO5
20.	What are the drawbacks of Contiguous Allocation of Disk Space?	2	K1	CO5
21.	What is the use of kernel modules in Linux?	2	K1	CO6
22.	Define virtualization.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Discuss in detail about the Evolution of the operating system.	11	K2	CO1
		OR			
	b)	Explain the concept of system calls, system programs and OS generation in detail.	11	K2	CO1
24.	a)	Explain the concept of Semaphore. Give the implementation of Readers-Writers Problem using Semaphore.	11	K2	CO2
		OR			
	b)	Explain the concept of Monitor. Give the implementation of Bounded Buffer Producer Consumer Problem using "Monitor".	11	K2	CO2
25.	a)	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:	11	K3	CO3

	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) What are the contents of the need matrix?
(ii) Is the system in a safe state? Why?
(iii) If a request from process P4 arrives for additional resources of (1, 2, 0, 0) can the banker's algorithm grant the request immediately?

OR

	b)	Apply the Wait-for Graph method for detecting deadlocks. How is it different from the Resource Allocation Graph method?	11	K3	CO3
26.	a)	Consider the reference string 6, 1, 1, 2, 0, 3, 4, 6, 0, 2, 1, 2, 1, 2, 0, 3, 2, 1, 2, 0 for a memory with three frames and calculate number of page faults by using FIFO,LRU and Optimal Page replacement algorithms. Also calculate the hit ratio and miss ratio.	11	K3	CO4

OR

	b)	Apply the basic concepts of segmentation in detail with suitable diagram.	*11*	*K3*	*CO4*
27.	a)	Consider the following disk request sequence for a disk with 100 tracks 45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25 Head pointer starting at 50 and moving in left direction. Find the number of head movements in cylinders using FCFS and SCAN Scheduling.	*11*	*K3*	*CO5*
		OR			
	b)	Explain about the linear list and hash table data structures to implement a directory.	*11*	*K2*	*CO5*
28.	a)	Discuss about the steps involved in the installation of the Linux multi-function server.	*11*	*K2*	*CO6*
		OR			
	b)	Illustrate the procedure for setting XEN on LINUX host and adding guest OS.	*11*	*K2*	*CO6*