Question Paper Code | 13656

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

Fourth Semester

Computer and Communication Engineering

20CCPW401 - OPERATING SYSTEMS WITH LABORATORY

Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	Which of the following is not a characteristic of an Operating System? (a) Process Management (b) Memory Management (c) Compiler Execution (d) Device Management	1	K1	CO1
2.	_____ contains the addresses of all the interrupt service routines. (a) Page table (b) Lookup table (c) Interrupt vector Table (d) Process control block	1	K1	CO1
3.	A process is selected from the _____ queue by the _____ scheduler, to be executed. (a) ready, short-term (b) wait, long term (c) blocked, short term (d) ready, long term	1	K1	CO2
4.	What is the primary purpose of using pipes in IPC? (a) To create multiple processes (b) To establish network connections (c) To enable communication between processes (d) To allocate memory for processes	1	K1	CO2
5.	An edge from process Pi to Pj in a wait for graph indicates that_____. (a) Pi is waiting for Pj to release a resource that Pi needs (b) Pj is waiting for Pi to release a resource that Pj needs (c) Pi is waiting for Pj to leave the system (d) Pj is waiting for Pi to leave the system	1	K1	CO3
6.	The two types of atomic operations in semaphore are (a) live & dead (b) read & store (c) initialize & reset (d) wait & signal	1	K1	CO3
7.	In segmentation, the mapping of two-dimensional user-defined addresses into one-dimensional physical addresses is affected by a _____. (a) Symbol table (b) Page table (c) Segment table (d) System table	1	K1	CO4
8.	A process is thrashing if: (a) it is spending more time paging than executing (b) page fault occurs (c) it is spending less time paging than executing (d) swapping cannot take place	1	K1	CO4
9.	A group of concentric circles on a disk platter is called as (a) Sector (b) Cylinder (c) Track (d) Cluster	1	K1	CO5
10.	Which of the following is NOT a common type of file system? (a) FAT (b) ext (c) NFS (d) APFS	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K–Level	CO
11.	Define Operating system.	2	K1	CO1
12.	Distinguish between batch systems and timesharing systems.	2	K2	CO1
13.	Mention the various CPU Scheduling criterias.	2	K1	CO2
14.	Differentiate between CPU bounded and I/O bounded processes.	2	K2	CO2
15.	List out the Requirements of Critical Section Problem.	2	K1	CO3
16.	"If there is a cycle in the resource allocation graph, it may or may not be in deadlock state ". Comment on this statement.	2	K2	CO3
17.	Outline about virtual memory.	2	K1	CO4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13656**

18.	Differentiate Internal and External Fragmentation.	2	K2	CO4
19.	State the typical bad-sector transaction.	2	K1	CO5
20.	Brief about Polling.	2	K1	CO5
21.	Compare the various file access methods.	2	K2	CO6
22.	List out the File Attributes and its types.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Discuss the essential properties of the following types of systems: Time sharing systems, Multi-processor systems and Distributed systems.   *11   K2   CO1*

OR

b) Explain the various types of computer system based on the types of processor.   *11   K2   CO1*

24. a) Consider the following set of processes with the length of the CPU-burst time in given ms: *11   K3   CO2*

Process	Burst Time	Arrival Time
P1	8	0
P2	4	1
P3	9	2
P4	5	3
P5	3	4

Draw the four Gantt charts illustrating the execution of these processes using FCFS, SJF and Round Robin (QUANTUM=2). Also calculate the waiting time and turnaround time for each scheduling algorithm.

OR

b) For below Processes table, calculate the average waiting time for the algorithms with Gantt chart using First Come First Serve, Shortest Job First and Priority Scheduling   *11   K3   CO2*

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

25. a) Discuss about Semaphore and its types with an example.   *11   K2   CO3*

OR

b) Consider the snapshot of a system   *11   K2   CO3*

	Max ABCD	Allocation ABCD	Available ABCD
P0	2001	42 12	3 3 21
P1	3121	52 52	
P2	2103	23 16	
P3	1312	14 24	
P4	1432	36 65	

Answer the following Using Banker's algorithm, considering Need matrix nil.
(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?

26.	a)	Evaluate when page faults will occur? Describe the actions taken by operating system during page fault with neat illustration.	*11*	*K3*	*CO4*

<div align="center">OR</div>

	b)	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 using FIFO replacement, LRU replacement and Optimal replacement with neat diagram.	*11*	*K3*	*CO4*

27.	a)	Explain about Swap Space Management.	*11*	*K2*	*CO5*

<div align="center">OR</div>

	b)	The requested tracks, in the order received are: 98, 183, 37, 122, 14, 124, 65, 67. Describe the following disk scheduling algorithms. Starting track at 53.FCFS, SSTF, C-SCAN, C-LOOK.	*11*	*K2*	*CO5*

28.	a)	Explain in detail about Directory Allocation methods.	*11*	*K2*	*CO6*

<div align="center">OR</div>

	b)	Describe about the file Sharing and Protection.	*11*	*K2*	*CO6*