Question Paper Code | **12710**

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024
Fourth Semester
Computer and Communication Engineering
20CCPW401 – OPERATING SYSTEMS WITH LABORATORY
Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	State the objectives of operating system.	2	K1	CO1
2.	Discuss tightly coupled systems and loosely coupled systems.	2	K2	CO1
3.	List out the data fields associate with Process Control Block.	2	K1	CO2
4.	Distinguish between Preemptive and Non- Preemptive Scheduling.	2	K2	CO2
5.	"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
6.	Distinguish between Thread and Process.	2	K2	CO3
7.	List out differences between logical and physical addresses.	2	K1	CO4
8.	Define Fragmentation and its types.	2	K1	CO4
9.	Define Transfer rate and Seek Time.	2	K1	CO5
10.	Quote the advantages of swap space management.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

			Marks	K–Level	CO
11.	a)	Explain different operating system structures with neat sketch.	13	K2	CO1

OR

			Marks	K–Level	CO
	b) i)	Explain the various memory hierarchies with neat block diagram.	6	K2	CO1
	ii)	Discuss the functionality of system boot with respect to an Operating System.	7	K2	CO1

12. a) Consider the following set of processes with the length of the CPU-burst time in given ms: 13   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, PRIORITY and RR (QUANTUM=2). Also calculate the waiting time and turnaround time for each scheduling algorithm

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

b) What is a Process? Discuss components of process and various states of a process with the help of a process state transition diagram and its Operations on the Process.　　13　K2　CO2

13. 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:　　13　K2　CO3

	Max A B C D	Allocation A B C D	Available A B C D	Need 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) How many resources of type A, B, C and D are there?
(ii) What are the contents of the need matrix?
(iii) Is the system in a safe state? Why?
(iv) If a request from process P4 arrives for additional resources of (1, 2, 0, 0) can the banker's Algorithm grant the request immediately? Justify with your answer

OR

b) i) Explain the methods for handling deadlock detection.　　6　K2　CO3

   ii) Discuss about the Producer Consumer Problem with necessary codes.　　7　K2　CO3

14. 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　　4　K3　CO4
   ii)　 FIFO replacement　　4　K3　CO4
   iii)　Optimal replacement　　5　K3　CO4

OR

b) Explain in detail about Segmentation and Contiguous memory allocation.　　13　K2　CO4

15. a) i) Discuss about the Kernel I/O Subsystems.　　7　K2　CO5
   ii) Explain about the Streams.　　6　K2　CO5

OR

b) Compare the functionalities of FCFS, SSTF, C-SCAN and CLOOK with an example.　　13　K2　CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create　　**12710**

PART - C (1× 15 = 15 Marks)

16. a) i) Explain in detail about Free Space Management and list its advantages.   *8*   *K2*   *CO6*

     ii) Define File and list out the various file operations and types.   *7*   *K1*   *CO6*

OR

   b) i) Discuss About Virtual File System.   *8*   *K2*   *CO6*

     ii) Explain any two file access methods.   *7*   *K2*   *CO6*