

<div style="border: 1px solid black; padding: 5px; transform: rotate(-90deg); transform-origin: center;"> 510403/510903 </div>	Roll No. _____	Total No of Pages: 3
<p>510403/510903</p> <p>B. Tech. V - Sem. (Main) Exam., December - 2020</p> <p>Computer & Science Engineering</p> <p>5CS4 – 03 Operating Systems</p> <p>Common with CSE & IT</p>		

Time: 3 Hours

Maximum Marks: 120

Min. Passing Marks:

Instructions to Candidates:

Part – A: Short answer questions (up to 25 words) 10×2 marks = 20 marks.
All ten questions are compulsory.

Part – B: Analytical/Problem solving questions 5×8 marks = 40 marks.
Candidates have to answer five questions out of seven.

Part – C: Descriptive/Analytical/Problem Solving questions 4×15 marks = 60 marks.
Candidates have to answer four questions out of five.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL

2. NIL

PART – A

- Q.1 What is Memory compaction? Why it is used? [2]
- Q.2 What are Device drivers? [2]
- Q.3 What is the difference between Absolute and Relative Path name of a file? [2]
- Q.4 What do you mean by Race Condition? [2]
- Q.5 A counting semaphore S is initialized to 10. Then 6p (wait) and 4v (signal) operations are performed on S. What is the final value of S. [2]
- Q.6 What are the various operations that can be performed on a file? [2]

- Q.7 Distinguish between Logical and Physical Address. [2]
- Q.8 What are the necessary conditions for the occurrence of deadlock? [2]
- Q.9 What is the difference between Hard and Soft Real-time systems? [2]
- Q.10 List out some reasons for process termination. [2]

PART – B

- Q.1 What are System calls? Explain the various types of system calls with an example for each. [8]
- Q.2 How is input/output request handled by the Device Manager? Also discuss functions of Device Driver. [8]
- Q.3 Suppose Disk drive has 300 cylinders. The current position of head is 90. The queue of pending request is 36,79,15,120,199,270,89,170. Calculate total head movement using FCFS and SSTF disk scheduling algorithms. <https://www.btubikaner.com> [8]
- Q.4 What is a Process? Discuss various states of a process with help of a process state transition diagram. [8]
- Q.5 Explain FCFS and Round Robin ($t_q=2ms$) scheduling algorithms with Gantt chart for the four processes given. Also compare their average turn-around and waiting time. [8]

Process	Arrival Time	Burst Time (in ms)
P ₁	0	10
P ₂	1	6
P ₃	2	12
P ₄	3	15

- Q.6 Explain various file system features of Linux operating system. [8]
- Q.7 Given memory partitions of 100KB, 500KB, 200KB, 300KB and 600KB (in order). Show with neat sketch, how would processes of 210KB, 418KB, 120KB and 437KB (in order), be placed using: first fit, best fit and worst fit algorithms. [8]

PART - C

Q.1 What is paging? How paging helps in eliminating fragmentation? Explain implementation of paging technique using TLB. [15]

Q.2 (a) What do you understand by Belady's Anomaly? Explain. [5]

(b) Consider the following page reference [10]

1,2,3,2,5,6,3,4,6,3,7,3,1,5,3,6,3,4,2,4,3,4,5,1 (consider frame size=4). Calculate total no. of page faults for FIFO, LRU and Optimal page replacement algorithms.

Q.3 What is Scheduling and why it is required? Also describe the differences among short-term, medium-term and long-term scheduling with suitable example. [15]

Q.4 What is Deadlock Avoidance? Example Banker's Algorithm with following snapshot of a system with resources A, B, C and D and processes P0 to P4:

	Max				Allocation				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	6	0	1	2	4	0	0	1	3	2	1	1
P ₁	1	7	5	0	1	1	0	0				
P ₂	2	3	5	6	1	2	5	4				
P ₃	1	6	5	3	0	6	3	3				
P ₄	1	6	5	6	0	2	1	2				

(i) What are contents of Need Matrix? [3]

(ii) Is the system in a safe state? [5]

(iii) If a request from process P₄ arrives for additional resources of (1, 2, 0, 0). Can request be granted immediately? [7]

Q.5 Explain the following with suitable diagrams-

(i) Android OS and its architecture [5]

(ii) Resource Allocation graph [5]

(iii) Various file access methods [5]