Name: **Enrolment No:**	

UPES

End Semester Examination, May 2024

Course: Operating System **Semester: IV**

Program: B. Tech E&CE **Time: 03 hrs.**

Course Code: CSEG 2007 **Max. Marks: 100**

Instructions:

1. **Attempt all the questions wisely.**
2. **All questions in section A, B and C are compulsory.**
3. **However, an internal choice to attempt any one question has given in question 9 of section B and question 11 of section C.**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define process and explain process control block?	**4**	**CO1**
Q 2	Discuss the different types of semaphore and its application.	**4**	**CO2**
Q 3	Explain the term deadlock in OS.	**4**	**CO3**
Q 4	Discuss what is seek time and transfer time.	**4**	**CO5**
Q 5	Explain page fault in OS.	**4**	**CO4**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6.	Explain resource allocation graph and its usage.	**10**	**CO3**
Q 7	Explain following concepts. i) Demand paging. ii) Thrashing iii) Fragmentation	**10**	**CO4**
Q 8	Suppose a disk drive has 400 cylinders, numbered 0 to 399.The driver is currently serving a request at cylinder 143 and previous request was at cylinder 125. The queue of pending request in FIFO order is: 86,147,312,91,177,48,309,222,175,130. Starting from the current head position what is the total distance in cylinders that the disk to satisfy all the pending request for each of the following disk scheduling algorithms? i) FCFS ii) LOOK iii) SCAN	**10**	**CO5**
Q 9	Explain the following concept. i) Bound Waiting ii) Multiprocessing operating system	**10**	**CO1, CO2**

<table>
<tr><td></td><td>iii) OS functions
OR
Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming 4 frames.
i) LRU replacement,
ii) FIFO replacement</td><td></td><td></td></tr>
<tr><td colspan="4">SECTION-C
(2Qx20M=40 Marks)</td></tr>
<tr><td>Q 10</td><td>Consider a paged memory system with 5 GB logical address space, 64 MB physical address space and 4KB size page. Furthermore, each page table entry is of 16 bits. Then calculate the following.
i) Bits in page offset
ii) Number of pages in process
iii) Bits for page number
iv) Number of frames in physical memory
v) Bits for frame
vi) Page table size.</td><td>20</td><td>CO4</td></tr>
<tr><td>Q 11</td><td>Consider the following system with 5 processes and 4 resources. A has total of 3 instances, B has 14 instances, C has 12 instances and D has 12 instances. In the table given below, column entry from 2 to 5 denotes the current resource allocation to each process and last four column represent the maximum resource required by a process of each type to complete.
<table>
<tr><td></td><td colspan="3">Current allocation</td><td colspan="3">Remaining need</td><td colspan="3">Current available</td></tr>
<tr><td></td><td>A</td><td>B</td><td>C</td><td>A</td><td>B</td><td>C</td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>P0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>P1</td><td>2</td><td>0</td><td>0</td><td>2</td><td>0</td><td>2</td><td></td><td></td><td></td></tr>
<tr><td>P2</td><td>3</td><td>0</td><td>3</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td></tr>
<tr><td>P3</td><td>2</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td></td><td></td><td></td></tr>
<tr><td>P4</td><td>0</td><td>0</td><td>2</td><td>0</td><td>0</td><td>2</td><td></td><td></td><td></td></tr>
</table>
Answer the following questions using banker’s algorithm:
i) What are contents of Maximum need matrix?
ii) Is the system in safe state?
iii) If request for process P2 arrives for (0,0,1). Can the request be granted immediately?
OR
Explain the following concepts:
i) Indexed File allocation
ii) Contiguous File allocation
iii) Multiprocessing vs Multitasking OS
iv) Process state diagram</td><td>20</td><td>CO1, CO2, CO3, CO5</td></tr>
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