**Name:**

**Enrolment No:**

**UPES**

**End Semester Examination, December 2024**

**Course: Operating System** **Semester: III**

**Program: Bachelor of Technology In Electronics & Computer Engg** **Time: 03 hrs.**

**Course Code: CSEG2068** **Max. Marks: 100**

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**Instructions: Attempt all the questions as per the instruction.**

**SECTION A**
**(5Qx4M=20Marks)**

| S. No. | | Marks | CO |
|---|---|---|---|
| Q 1. | What are file permissions in a Unix-like operating system? Explain the role of the user, group, and others in file permissions. | 4 | CO4 |
| Q 2. | How does a Resource Allocation Graph **(RAG)** help in detecting deadlock in a system? Describe the steps to detect deadlock using RAG. | 4 | CO5 |
| Q 3. | Discuss the difference between the Logical Address Space and Physical Address Space? | 4 | CO3 |
| Q 4. | Discuss the concept of address binding in an operating system? | 4 | CO3 |
| Q 5. | Discuss the difference between the Time-Sharing Operating System and Multiprocessing System? | 4 | CO1 |

**SECTION B**
**(4Qx10M= 40 Marks)**

| | | | |
|---|---|---|---|
| Q 6. | What is a scheduler in an operating system? Discuss long-term, mid-term, and short-term schedulers in detail. | 1+3+3+3=10 | CO2 |
| Q 7. | Discuss the following terms I) Seek time II) Rotational latency III) Disk Capacity IV) Track capacity V) Cylinder capacity | 2*5=10 | CO4 |
| Q 8. | Consider the following set of processes, each with an arrival time and a total burst time<br>Process \| Arrival Time \| Burst Time<br>A \| 0 \| 5<br>B \| 0 \| 11<br>C \| 0 \| 2<br>D \| 0 \| 6<br>a) Find the average waiting time with q= 2, q=4, q=11 by using Round Robin.<br>b) Provide your analysis on increasing value of q on average waiting time. | 4+3+3=10 | CO2 |

| | | | |
|---|---|---|---|
| | c) What is the average waiting time if FCFS scheduling algorithm is used in place of RR | | |
| **Q 9.** | What is critical section in an operating system? Discuss mutual exclusion, progress and bounded waiting in detail.<br>**OR**<br>Discuss the algorithm in detail which is used for solving the critical section problem for two processes. | **10** | **CO5** |
| | **SECTION-C**<br>**(2Qx20M=40 Marks)** | | |
| **Q 10.** | Consider a disk scheduling scenario where the disk head is initially at position 80. The following disk request queue is given: [170, 40, 10, 140, 50, 60, 130]. Assume that the disk has 180 tracks numbered from 0 to 179. Calculate the total seek time with the following.<br>I) SSTF<br>II) SCAN<br>III) C-SCAN<br>IV) C-LOOK | **4*5=20** | **CO4** |
| **Q 11.** | The following page reference sequence is provided **1, 2, 3, 4, 1, 2, 5, 6, 3, 4,7, 8, 1.**<br><br>Find the total number of page faults with the following scenario.<br><br>a) Page Replacement Policy: **FIFO**, number of page frames=**3**<br>b) Page Replacement Policy: **FIFO**, number of page frames=**6**<br>c) Page Replacement Policy: **OPTIMAL**, number of page frames=**3**<br>d) Discuss the term **Belady's Anomaly** in the context of page replacement policy.<br><br>**OR**<br><br>a) Given Logical Address Space (LAS) = 4 GB, Physical Address Space (PAS) = 1 GB and the frame bit = 20.<br>i) Find the total number of pages.<br>ii) Find the total number of frames.<br>iii) Find the page size<br>iv) Find page table size.<br>b) Discuss the following memory allocation strategies with suitable example<br>i) First fit<br>ii) Best fit<br>c) Discuss virtual memory and demand paging in detail. | **4*5=20**<br><br>**OR**<br><br>**8+4+8=20** | **CO3** |