

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-IV Semester (CSE&IT)

COURSE CODE (CREDITS): 18B11CI411 (3)

MAX. MARKS: 35

COURSE NAME: Operating System

COURSE INSTRUCTORS: ATA, SMA, PTK, PDN

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Scientific calculator is allowed.

Q.No	Question	CO	Marks
Q1	A magnetic disk has 100 cylinders, each with 10 tracks of 10 sectors. If each sector contains 128 bytes, what is the maximum capacity of the disk in kilobytes? Given a disk with 200 tracks, where track requests are received in the following order 55, 58, 39, 18, 90, 160, 150, 38, 184. The starting position for the arm is track 100. What is the total number of tracks crossed when the elevator algorithm, starting in the right direction, algorithm is used?	6	2+3
Q2	Consider a single level paging scheme. The Virtual address space is 32 bits and Physical address is 28 bits and Page size is 4 KB. Compute page number, frame number and offset.	4	2
Q3	Consider the following page reference string: 7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1 Assuming demand paging with three frames (initially empty), how many page faults would occur for the following page replacement algorithms? (a) LRU replacement (b) Optimal replacement	4	3+3
Q4	A system uses FIFO policy for page replacement. It has seven page frames with no pages loaded to begin with. The system first access 90 distinct pages in some order and then access the same 90 pages, but now in the reverse order. How many page faults will occur? Justify your answer with proper explanation.	4	2
Q5	A Computer system implements 8 kilobyte pages and a 32-bit physical address space. Each page table entry contains a valid bit, a dirty bit, three permission bits, and the translation. If the maximum size of the page table of a process is 24 megabytes, find the length of the virtual address supported by the system in bits.	4	4
Q6	A system has 1 GB of RAM. The OS takes up 256 MB. The rest is available for user processes. If a first-fit algorithm is used, and processes request the following sizes in MB in order: 100, 200, 150, 180, and then a 120 MB process requests memory, Which block will it	4	4

	be allocated to? What is the total internal fragmentation?																																
Q7	Consider a single level paging scheme. The virtual address space is 8 MB and page size is 4 KB. What is the maximum page table entry size possible such that the entire page table fits well in one page?	4	2																														
Q8	Assume higher the number lower the priority. Find completion time, Turn Around Time, Waiting Time for following Processes (In Preemptive fashion) by drawing Gantt Chart:	6	3																														
	<table border="1"> <thead> <tr> <th>Process#</th> <th>Arrival Time</th> <th>Priority</th> <th>CPU Burst</th> <th>I/O Burst</th> <th>CPU Burst</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>2</td> <td>1</td> <td>5</td> <td>3</td> </tr> <tr> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>1</td> </tr> <tr> <td>3</td> <td>3</td> <td>1</td> <td>2</td> <td>3</td> <td>1</td> </tr> <tr> <td>4</td> <td>3</td> <td>4</td> <td>2</td> <td>4</td> <td>1</td> </tr> </tbody> </table>	Process#	Arrival Time	Priority	CPU Burst	I/O Burst	CPU Burst	1	0	2	1	5	3	2	2	3	3	3	1	3	3	1	2	3	1	4	3	4	2	4	1		
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Q10	Write 4 System calls for managing files in Operating System	5	2																														

All the Best