

**CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**  
**FACULTY OF TECHNOLOGY & ENGINEERING**

**Computer Engineering/Computer Science and Engineering**

**Subject: Operating System**

**Subject Code: CE248**

**Date:**

**Time: 10:00- to 12:00**

**Marks:70**

Instructions: All the Questions are compulsory.

Section-I contains 40 Multiple Choice questions. Each of 1 Mark.

For section-I→Time -60 minutes.

Section-II contains descriptive questions of 30 marks.

For section-II→Time -60 minutes

	SECTION-I	
Q1.	Answer the Following.	Marks (40)
1. 1	<p>State whether true or false.</p> <p>i) Multithreading is useful for application that perform a number of essentially independent tasks that do not be serialized.</p> <p>ii) An example of multithreading is a database server that listens for and process numerous client request.</p> <p>A) i-True, ii-False <b>B) i-True, ii-True</b> C) i-False, ii-True D) i-False, ii-False</p>	1
2.	<p>..... is a large kernel, including scheduling file system, networking, device drivers, memory management and more.</p> <p><b>A) Monolithic kernel</b> B) Micro kernel C) Macro kernel D) Mini kernel</p>	1
3.	<p>What will be the internal fragmentation for following block sizes: 25,100,250,200,100,150 using FIRST FIT_____?</p> <p>Processes requests in following order: P1=200, P2=75, P3=200, P4=15, P5=140</p> <p>A) 75 B) 93 <b>C) 95</b> D) 45</p>	1
4.	<p>..... is a facility that allows programmers to address memory from a logical point of view, without regard to the main memory, physically available.</p> <p>A) Visual memory B) Real memory <b>C) Virtual memory</b> D) Secondary</p>	1

	memory							
5.	<p>The ..... Determines when a page should be brought into main memory.</p> <p>A) <b>Fetch policy</b> B) Placement policy C) Replacement policy D) Resident set management</p>	1						
6.	<p>With ..... only one process can execute at a time; meanwhile all other process are waiting for the processor. With..... More than one process can be running simultaneously each on a different processor.</p> <p>A) Multiprocessing, Multiprogramming</p> <p>B) Multiprogramming, Uniprocessing</p> <p>C) <b>Multiprogramming, Multiprocessing</b></p> <p>D) Uniprogramming, Multiprocessing</p>	1						
7.	<p>Match the following mechanisms for interrupting the execution of a process and their uses.</p> <table> <tr> <td>i) Interrupt</td> <td>a) Call to an operating system function</td> </tr> <tr> <td>ii) Trap</td> <td>b) Reaction to an asynchronous external event</td> </tr> <tr> <td>iii) Supervisor Call</td> <td>c) Handling of a error or an exception condition</td> </tr> </table> <p>A) i-a, ii-b, iii-c          B) B) i-c, ii-a, iii-b          C) C) <b>i-b, ii-c, iii-a</b>          D) D) i-a, ii-c, iii-b</p>	i) Interrupt	a) Call to an operating system function	ii) Trap	b) Reaction to an asynchronous external event	iii) Supervisor Call	c) Handling of a error or an exception condition	1
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iii) Supervisor Call	c) Handling of a error or an exception condition							
8.	<p>With ..... A page is written out to secondary memory only when it has been selected for replacement.</p> <p>A) pre-cleaning B) <b>demand cleaning</b> C) required cleaning D) fast cleaning</p>	1						
9.	<p>Producer consumer problem can be solved using</p> <p>a) semaphores b)event counters c)monitors d) <b>All of the given</b></p>	1						
10.	<p>Throughput of a system is</p> <p>A) <b>Number of programs processed by it per unit time</b></p>	1						

	B) Number of times the program is invoked by the system C) Number of requests made to a program by the system D) None of the above	
11.	Inter process communication can be done through_____. A) Mails B) Messages C) System calls D) Traps	1
12.	Consider the Transaction Look aside buffer and assume that the entire page table and all the pages are in the physical memory. It takes 400 milliseconds to search the TLB and 50 milliseconds to access the physical memory. If the TLB hit ratio is 0.9, the effective memory access time (in milliseconds) is_____ A) 890 B) 450 C) 490 D) 800	1
13.	As per banker's algorithm if for process P1, Allocation (1,3,5,4), Need (1,0,0,2), Available (1,5,3,2) then new available resource after the successful completion of P1 is _____ A) (2,4,5,6) B) (2,8,8,6) C) Request is granted D) Reuest is granted and the available resource is (2,8,8,6)	1
14.	_____page replacement algorithm suffers from belady's anamoly. A) LRU B) MRU C) FIFO D) LIFO	1
15.	Processes will share the Transaction Look aside buffer among them.  A) True B) False	1
16.	Select the appropriate for producer consumer problem:  A) No synchronization is required between producer and consumer so that consumer will not consume the item which	1

	<p>has not yet been produced by producer.</p> <p>B) We must have buffer, that can be filled by the producer and emptied by consumer</p> <p>C) Producer should consume one item and consumer should produce an item.</p> <p>D) There will be separate buffers for producer and consumer in the memory.</p>	
17.	<p>Which of the following is/are fastest memory allocation policy?</p> <p>A) First Fit</p> <p>B) Best Fit</p> <p>C) Worst Fit</p> <p>D) Next Fit</p> <p>E) All of the above</p> <p>F) First Fit and Next Fit</p>	1
18.	<p>Assume a page reference string for a process with m frames (initially all empty). The page reference string has length p with n distinct page numbers occurring in it. For any page-replacement algorithms, what is a lower bound &amp; an upper bound on the number of page faults?</p> <p>A) <math>n/2, p</math></p> <p>B) p, n</p> <p>C) n, <math>p/2</math></p> <p>D) n, p</p>	1
19.	<p>If the no of pages in a 32 bit machine is 8kB then what is the size of the page table?</p> <p>A) 8kb</p> <p>B) 16kB</p> <p>C) 4 KB</p> <p>D) Can't say</p>	1
20.	<p>Consider Logical address of 24b and physical address of 16b what will be the size of main memory and secondary memory? Assume that memory is byte addressable.</p> <p>A) 8MB, 64KB</p> <p>B) 4MB, 32 KB</p> <p>C) 16MB, 32KB</p>	1

	D)4MB, 64MB	
21.	<p>Which of the following memory allocation scheme suffers from External fragmentation?</p> <p>A) Segmentation</p> <p>B)Paging</p> <p>C)Pure demand paging</p> <p>D)Swapping</p>	1
22.	<p>Which directory implementation is used in most Operating System?</p> <p>A) Single level directory structure</p> <p>B)Two level directory structure</p> <p>C) Three level directory structure</p> <p>D) Acyclic directory structure</p>	1
23.	<p>..... is a condition in which there is a set of concurrent processes, only one of which is able to access a given resource or perform a given function at any time.</p> <p>A) Mutual Exclusion</p> <p>B) Busy Waiting</p> <p>C) Deadlock</p> <p>D) Starvation</p>	1
24.	<p>A _____ contains information about the file, including ownership, permissions, and location of the file contents.</p> <p>A)File Allocation Table</p> <p>B)File control Block</p> <p>C)Device drivers</p> <p>D)File system</p>	1
25.	<p>In process scheduling, ..... determines which ready process will be executed next by processor.</p> <p>A) long term scheduler</p>	1

	<p>B) medium term scheduler</p> <p>C) short term scheduler</p> <p>D) none of the above</p>							
26.	<p>In an absolute loading scheme, which loader function(s) is (are) accomplished by programmer</p> <p>a) Allocation</p> <p>b) Linking</p> <p>c) Allocation and Linking</p> <p>d) Reallocation</p>	1						
27.	<p>Match the following.</p> <table><tr><td>i) Mutual exclusion while waiting assignment.</td><td>a) A process may hold allocated resources</td></tr><tr><td>ii) Hold and wait from a process holding it.</td><td>b) No resource can be forcibly removed</td></tr><tr><td>iii) No preemption at a time.</td><td>c) Only one process may use a resource at</td></tr></table> <p>A) i-a, ii-b, iii-c</p> <p>B) B) i-a, ii-c, iii-b</p> <p>C) C) i-b, ii-c, iii-a</p> <p>D) D) i-c, ii-a, iii-b</p>	i) Mutual exclusion while waiting assignment.	a) A process may hold allocated resources	ii) Hold and wait from a process holding it.	b) No resource can be forcibly removed	iii) No preemption at a time.	c) Only one process may use a resource at	1
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28.	<p>Thrashing</p> <p>A) is a natural consequences of virtual memory system</p> <p>B) can always be avoided by swapping</p> <p>C) always occurs on large computers</p> <p>D) can be caused by poor paging algorithms</p>	1						
29.	<p>In the multiprogramming system, a set of processes is deadlock if each process in the set is waiting for an event to occur that can be initialized only by another process in the set. Which of the following is not one of the four conditions that are necessary for deadlock to occur?</p> <p>A) No preemption</p> <p>B) process suspension</p> <p>C) partial assignment of resources</p>	1						

	D)circular wait	
30.	<p>State which statement is true for Suspended process?</p> <p>i) The process is not immediately available for execution.</p> <p>ii) The process may be removed from suspended state automatically without removal order.</p> <p>A) <b>i only</b></p> <p>B) B) ii only</p> <p>C) C) i and ii only</p> <p>D) D) None</p>	1
31.	<p>An optimal scheduling algorithm in terms of minimizing the average waiting time of a given set of processes is .</p> <p>A) FCFS scheduling algorithm</p> <p>B) Round robin scheduling algorithm</p> <p><b>C) Shortest job - first scheduling algorithm</b></p> <p>D) None of the above</p>	1
32.	<p>Consider a paging system with the page table stored in memory. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?</p> <p>A) 600 nanoseconds</p> <p>B) 200 nanoseconds</p> <p><b>C) 400 nanoseconds</b></p> <p>D) can't say</p>	1
33.	<p>In operating system above the physical hardware and below system call is known as</p> <p>A)Bus</p> <p>B)Shell</p> <p>C)Stub</p> <p><b>D)Kernel</b></p>	1
34.	<p>What does the following command do ?</p> <p>grep - vn "123" x</p> <p><b>A)It will print all of the lines in the file x that match the search string "123"</b></p> <p>B)It will print all of the lines in file x that do not match the search</p>	1

	<p>number 123</p> <p>C) It will give the error as command cannot search for number, it will search only pattern.</p> <p>It will print the specific line numbers of file x in which there is a match for the string "123"</p>	
35.	<p>In UNIX, processes that have finished execution but have not yet had their status collected are known as .....</p> <p>A) Sleeping processes</p> <p>B) Stopped Processes</p> <p>C) <b>Zombie Processes</b></p> <p>D) Orphan Processes</p>	1
36.	<p>Head is moved from 91 to 103, so the time taken by head is</p> <p>(A) Settle Time</p> <p>(B) Rotational latency</p> <p>(C) <b>Seek Time</b></p> <p>(D) Waiting time</p>	1
37.	<p>The swap space in disk is used for,</p> <p>(A) Saving temporary html pages</p> <p>(B) <b>Saving process data</b></p> <p>(C) Storing the super-block</p> <p>(D) Storing device drivers</p>	1
38.	<p>Unix command to change the case of first five lines of file "operating system" from lower to upper</p> <p>A) \$ tr '[a-z]' '[A-Z]' operating system   head-5</p> <p>B) <b>\$ head-5 operating system   tr '[a-z]' '[A-Z]'</b></p> <p>C) \$ tr head-5 operating system '[A-Z]' '[a-z]'</p> <p>D) \$ tr operating system head-5 '[a-z]' '[A-Z]'</p>	1



39.	Increasing the RAM of a computer typically improves performance because: (A) Virtual memory increases (B) Larger RAMs are faster (C) Fewer page faults occur (D) Fewer segmentation faults occur	1																				
40.	In the context of Banker's algorithm, which of the following is/are not true?  A) The unsafe state may not always lead to a deadlock  B) This algorithm works only if there is a single instance of each recourse.  C) A state is safe if the system can allocate recourses to each process in some order.  A safe state avoids deadlock.	1																				
	Section II																					
1	Consider the following set of processes with CPU burst time. <table border="1"><thead><tr><th>Process</th><th>Burst Time</th><th>Priority</th><th>Arrival Time</th></tr></thead><tbody><tr><td>P0</td><td>10</td><td>3</td><td>0</td></tr><tr><td>P1</td><td>13</td><td>1</td><td>1</td></tr><tr><td>P2</td><td>3</td><td>3</td><td>2</td></tr><tr><td>P3</td><td>8</td><td>4</td><td>3</td></tr></tbody></table> Calculate mean turnaround time and average waiting time for following scheduling algorithm. Consider smallest number as highest priority  1. SRTF 2. Priority scheduling preemptive approach.	Process	Burst Time	Priority	Arrival Time	P0	10	3	0	P1	13	1	1	P2	3	3	2	P3	8	4	3	7
Process	Burst Time	Priority	Arrival Time																			
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	OR																			
1	<p>Consider the following five processes with the length of the CPU burst time in milliseconds.</p> <table border="1"> <thead> <tr> <th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr> </thead> <tbody> <tr> <td>P0</td><td>10</td><td>3</td></tr> <tr> <td>P1</td><td>1</td><td>1</td></tr> <tr> <td>P2</td><td>2</td><td>3</td></tr> <tr> <td>P3</td><td>1</td><td>4</td></tr> <tr> <td>P4</td><td>5</td><td>2</td></tr> </tbody> </table> <p>For the above set of processes find the average waiting time and average around time for each of the following scheduling algorithm using Gantt chart.</p> <ol style="list-style-type: none"> <li>1. SJF</li> <li>2. RR ( Q = 2)</li> </ol>	Process	Burst Time	Arrival Time	P0	10	3	P1	1	1	P2	2	3	P3	1	4	P4	5	2	7
Process	Burst Time	Arrival Time																		
P0	10	3																		
P1	1	1																		
P2	2	3																		
P3	1	4																		
P4	5	2																		
2	Memory partitions of 100kb,500 kb,200 kb,300kb,600 kb is available how would best, worst, first fit algorithm will place processes 212,417,112,426 in order considering fixed length partition. Which is the best algorithm?	4																		
3	Consider the reference stream 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults will be there using FCFS and Optimal Page replacement algorithm using 2 frames?	6																		
	OR																			
3	Consider the reference stream 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults will be there using LRU and Second Chance algorithm using 2 frames?	6																		
4	For the figure given below, discuss whether the system will be in safe state or not? If system is in safe state, find the safe sequence/sequences.	7																		

	<p>The diagram illustrates a disk scheduling system with three disks, labeled R1, R2, and R3, and four processes, labeled P0, P1, P2, and P3. Disks R1 and R2 are positioned at the top, while R3 is at the bottom. Processes P1, P0, P2, and P3 are arranged horizontally between the disks. Arrows indicate the direction of data flow: from R1 to P1, from P1 to R2, from R2 to P0, from P0 to R3, from R3 to P2, from P2 to R2, from R2 to P3, and a self-loop on R2.</p>	
5	<p>The queue of requests in FIFO is 86,147,91,177,94,150,102,175,130 What is the total head movement needed to satisfy the requests for the following Scheduling algorithms LOOK, C-SCAN. Currently head is at 94.</p>	6