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## **B.Tech DEGREE EXAMINATION, DECEMBER 2023**

Third & Fourth Semester

## 18AIC208J - OPERATING SYSTEM DESIGN

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

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i. Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.
ii. Part - B and Part - C should be answered in answer booklet.

ime	: 3 Hours		Max.	Marks	: 100
	PART - A $(20 \times 1 = 20)$		Ma	rks BL	CO
	Answer all Quest	tions			
1.	What is an operating system?  (A) collection of programs that manage hardware resources  (C) link to interface the hardware and application programs	<ul><li>(B) system service provider to the application programs</li><li>(D) link to interface the hardware only</li></ul>	1	1	1
2.	A single thread of control allows the process (A) only one task at a time (C) two tasks at a time	(B) multiple tasks at a time (D) No Process	1	2	1
3.	A parent process calling system processes terminate (A) wait (C) exec	(B) fork (D) exev		1	1
4.	If a process is executing in its critical se executing in their critical section. This cond (A) critical exclusion (C) asynchronous	ection, then no other processes can be ition is called  (B) synchronous  (D) mutual exclusion	; 1	1	1
5.	The interval from the time of submission of termed as(A) waiting time  (C) response time	of a process to the time of completion is  (B) turnaround time  (D) throughput	s 1	1	2
6.	In priority scheduling algorithm, when a priority is compared with the priority of(A) all process (C) currently running process	(B) parent process (D) init process	s 1	2	2
7.	Which algorithm is defined in Time quantum (A) shortest job scheduling algorithm	(B) multilevel queue scheduling algorithm	1	2	2
	(C) priority scheduling algorithm	(D) round robin scheduling algorithm			
8.	A system is in the safe state if  (A) the system cannot allocate resources to each process in some order and still avoid a deadlock	(B) there exist a safe sequence	1	2	2
	(C) enters into deadlock condition	(D) the system can allocate resources to each process in some order and stil avoid a deadlock	1		

9.	All routines are kept on disk in a relocation loaded into memory and is executed whene (A) Dynamic linking (C) Static linking	estable load format. The main program is ever needed. This is called	1	2	3
10.	is a condition, where there is e request but the available spaces are not con (A) First fit (C) External fragmentation	enough total memory space to satisfy a tiguous  (B) Internal fragmentation  (D) Segmentation	1	2	3
11.	are the two techniques the processes to be noncontiguous, thus physical memory wherever such memory is (A) Segmentation and Compaction (C) Fragmentation and Paging	es that permit the logical address space of allowing a process to be allocated with available  (B) Paging and Compaction  (D) Segmentation and Paging	1	2	3
12.	In segmentation, each address is specified by (A) Segment number & offset (C) Value & segment number	(B) Offset & value (D) Key & value	1	1	3
13.	The situation where the processor spends rather than executing instructions is called:  (A) Paging  (C) Thrashing	most of its time swapping process pieces  (B) The Principle of Locality  (D) Swapping	1	2	3
14.	The LRU page replacement policy can be in (A) Counters (C) RAM & Registers	mplemented using  (B) Stack & Counters  (D) Registers	1	1	3
15.	Which is a technique to efficiently copy dat (A) Copy-on-write (C) Thrashing	a resources in a computer system?  (B) Swapping  (D) Paging	1	1	4
16.	The is the additional time the disk head  (A) Bandwidth  (C) seek time	for the disk to rotate the desired sector to  (B) rotational latency  (D) Storage-area network	1	2	4
17.	Which of the following commands is used to (A) log (C) chmod	o set the change the file permissions (B) dir (D) passwd	1	1	5
18.	3. In the algorithm, the disk arm goes as far as the final request in each direction, then reverses direction immediately without going to the end of the disk.		1	2	5
	(A) LOOK (C) C-SCAN	(B) SCAN (D) C-LOOK			
19.	Free space list cannot be implemented as (A) Bitmap (C) Indexed	(B) Grouping (D) Counting	1	1	5
20.	In indexed allocation  (A) each file must occupy a set of contiguous blocks on the disk  (C) all the pointers to scattered blocks are placed together in one location	<ul><li>(B) each file is a linked list of disk blocks</li><li>(D) none of the mentioned</li></ul>	.1	2	5
	PART - B ( $5 \times 4 = 20$ Answer any 5 Que		Marks	BL	CO
21.	Explain the different operations on processe		4	2	1

22.	Discuss in detail on critical section problem	4	2	1
23.	Differentiate the Internal fragmentation problem with the External Fragmentation problem. Give an example for each.	4	4	2
24.	Describe the relationship between effective access time and the page fault rate	4	4	3
25.	Illustrate the Working set Model in Thrashing.	4	3	4
26.	List and discuss briefly about various file attributes.	4	2	5
27.	Discuss on how the free space list is maintained in storage disks.	4	4	. 5
	PART - C (5 × 12 = 60 Marks) Answer all Questions	Mark	ks BL	CO
28.	(a) Describe in detail about Dining Philosophers problem with code snippet.  (OR)	12	2	1
	(b) Discuss how the Inter-process communication mechanism helps in message passing for cooperating processes to exchange messages.			
29.	(a) Five batch jobs, A through E, arrive at a computer center at essentially the same time. They have an estimated running time of 15, 9, 3, 6, and 12 minutes, respectively. Their (externally defined) priorities are 6, 3, 7, 9, and 4, respectively, with a lower value corresponding to a higher priority. For each of the following scheduling algorithms, determine the turnaround time for each process and the average turnaround for all jobs. Ignore process switching overhead. Explain how you arrived at your answers.  (i) FCFS  (ii) SJF	12	3	2
	(iii) Round Robin with a time quantum of 1 minute (iv)Priority Scheduling			
*	(OR)  (b) Discuss in detail about the bankers algorithm with respect to (i) safety algorithm (ii) Resource-request algorithm.			
30.	<ul> <li>(a) With a neat sketch, explain how a logical address is translated into a physical address using the Paging mechanism.</li> <li>(OR)</li> <li>(b) Explain the need for demand paging, and illustrate the steps, of how an OS</li> </ul>	12	3	3
	handles the page faults.			
31.	(a) Consider the following page reference string 1,2,3,4,1,2,5,1,2,3,4,5. How many page faults would occur for the LRU, FIFO, and optimal page replacement algorithms, assuming four frames and all frames are initially empty?	12	3	4
	(OR)			
	(b) Consider the following disk request sequence for a disk with 100 tracks 45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25. Head pointer starting at 50 and moving in the left direction. Find the number of head movements in cylinders using FCFS and SSTF scheduling with proper illustration. Also, find out the best algorithm for this scenario.			
32.	<ul> <li>(a) Discuss in detail the various methods on how disk blocks are allocated for files.</li> <li>Contiguous allocation</li> <li>Linked allocation</li> <li>Indexed allocation</li> <li>(OR)</li> <li>(b) Define RTOS. List the design issues. Explain the components of RTOS with a neat sketch.</li> </ul>	12	4	5

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Beführeidlige die Angesch Angebeiddich siedben wieben wich die Astend. Frigulfuhren aufblich Alberte de en inter für best

till flagski skriver fyritt visker i diffette ef vil ei'r fifger ee'r kan wêrsgel

taryoj krili milituri. Situa di katuroj ir operačnos di flakki ogravo il maroko modo, je zgri odlejše, sklji

awa rawete

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