(i) Identify CPU scheduling algorithms that would be most suitable for this scenario and calculate the average waiting time and average turnaround time.

(ii) Calculate average waiting time and average turnaround time for shortest job first scheduling algorithm.

(OR)

b. Consider the following snapshot of a system:
Total maximum instances of A=3, B=4, C=12 and D=12.

Process	Allocation				Max.			
	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2
P_1	1	0	0	0	1	7	5	0
P_2	1	3	5	4	2	3	5	6
P_3	0	6	3	2	0	6	5	2
P_4	0	0	1	4	0	6	5	6

Available			
A	B	C	D
1	5	2	0

Answer the following questions using Banker's algorithm.

(i) Determine the need matrix for the above system. 2 4 2 2

(ii) Is the system in a safe state? If yes, mention the sequence. 8 3 2 2

28. a.i. Consider processes P1 (401 kB), P2 (321 kB), P3 (117 kB), P4(211kB), P5(121kB) arrives in order. Illustrate first-fit, best-fit and worst-fit process placement algorithms with given memory partitions 200 kB, 100kB, 300 kB, 600 kB, 400 kB. 6 3 3 3

ii. Write a short note on programmer convenient memory management technique. 4 2 3 3

(OR)

b. Explain about paging in operating systems. 10 3 3 3

29. a. Consider the following page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 4, 2, 3, 0, 3, 2. Determine the page faults in FIFO, LRU and optimal page replacement algorithm with frame size as 3. 10 4 4 4

(OR)

b. With the neat diagram, elaborate the page table and inverted page table. 10 3 4 4

30. a. Explain various file organization methods with an example. 10 2 5 5

(OR)

b. Consider the following sequence of disk track requests 27, 129, 110, 186, 147, 41, 10, 64, 120. Assume that the disk head is initially positioned at 100 and moving in the direction of decreasing track number. Calculate the total disk arm movements for LIFO, SSTF, SCAN, C-SCAN disk scheduling. 10 4 5 5

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Reg. No.														

B.Tech. DEGREE EXAMINATION, MAY 2022
Fourth Semester

18CSC205J – OPERATING SYSTEMS
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:

(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 40th minute.

(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

PART – A (25 × 1 = 25 Marks) Marks BL CO PO
Answer **ALL** Questions

1. Termination of the process terminates _____. 1 2 1 1
(A) First thread of the process (B) First two threads of the process
(C) All threads within the process (D) No thread within the process

2. A _____ is an active entity whereas _____ is said to be as passive entity. 1 2 1 1
(A) Process, program (B) Program, process
(C) Processor, process (D) Program, processor

3. _____ system call is used after a fork ( ) to replace the process memory space with a new program. 1 1 1 1
(A) wait ( ) (B) exec ( )
(C) Sleep ( ) (D) kill ( )

4. Consider process P is in run state, during the execution it needs, to read a file sample.text from memory. Identify the current state of P. 1 2 1 1
(A) idle (B) sleep
(C) run (D) Blocked

5. Identify the two functions which are used in message passing system. 1 1 1 1
(A) send(msg), delete(msg) (B) send(msg), write(msg)
(C) send(msg), receive(msg) (D) write(msg), delete(msg)

6. Peterson's solution for process synchronization is restricted to _____ process. 1 1 2 2
(A) 1 (B) 2
(C) 3 (D) Multiple processes

7. Which statement is false about semaphore operations? 1 2 2 2
(A) When a process is in critical section the other process loops indefinite (B) Counting semaphore values are restricted
(C) Binary semaphore values range between 0 and 1 (D) Avoids critical section problems in a concurrent system such as multitasking operating system

8. A _____ is a scgmcnt and observe which of the following can summarize trials that function on shared data structure. 1 1 2 2
   (A) Monitor (B) Semaphore
   (C) Critical section (D) Mutex locks

9. The time from arrival of interrupt to start of routine that services interrupt is called _____. 1 1 2 2
   (A) Interrupt latency (B) Scheduler
   (C) Dispatch latency (D) Hardware latency

10. A system is in safe state only if there exists a _____. 1 2 2 2
   (A) Safe allocation (B) Safe resource
   (C) Safe sequence (D) Safe deallocation

11. Operating system maintains the page table for _____. 1 2 3 3
   (A) each process (B) each thread
   (C) each instruction (D) each address

12. Memory binding instruction generates _____ for known memory location and generate _____ for unknown memory location during the compile time. 1 1 3 3
   (A) Physical address, virtual address (B) Absolute code, delocatable code
   (C) Base address, limit address (D) Absolute code, binary code

13. Which statement is true about static partitioning scheme? 1 2 3 3
   (A) Partition are made before execution (B) Partitions are allocated to the process as they arrive
   (C) Each partition is allowed to storc only one process (D) Memory contains a set of holes of various sizes

14. _____ aids in having lesser effective access time. 1 1 3 3
   (A) Memory compaction (B) Translation look aside buffer
   (C) Static partitioning (D) Dynamic partitioning

15. A process may have few longer CPU bursts if it is in _____. 1 1 3 3
   (A) I/O bound (B) CPU bound
   (C) Critical section (D) Mutex lock

16. System libraries are used by various processes where each processes are mapped to shared object into a 1 2 4 4
   (A) Physical address space (B) Virtual address space
   (C) Memory address space (D) Contiguous address space

17. In copy on write technique, the pages which are altered by either process are copied while the _____ pages are shared between parent and child processes. 1 2 4 4
   (A) Altered (B) Modified
   (C) Unaltered (D) Unmodified

18. A user's entire program is loaded in the physical memory even though it is not needed during program execution time is known as 1 2 4 4
   (A) Pure demand paging (B) Demand paging
   (C) Not demand paging (D) Virtual paging

19. During page fault, the tables which are referred are kept in 1 1 4 4
   (A) Page table (B) Dynamic table
   (C) Process control block (D) Demand table

20. A ratio on which the effective memory access time depends on 1 2 4 4
   (A) Miss ratio (B) Hit ratio
   (C) Both hit and miss ratio (D) Bit ratio

21. The free space list in disk can be utilized by 1 1 5 5
   (A) Frames (B) Pages
   (C) Bitmap (D) Arrays

22. $-rwxr-xr--$ meaning of this command for owner is 1 2 5 5
   (A) Owner has execute permission (B) Owner has read, write and execute permission
   (C) Owner has read permission only (D) Owner has read and execute permission

23. The methods how LRU page replacement policy can be implemented in hardware are 1 1 5 5
   (A) Counters (B) RAM and Register
   (C) Stack and counter (D) Registers

24. Sequential access methods are used in 1 1 5 5
   (A) Remote file systems (B) Distributed file system
   (C) Networked file systems (D) Tape drives

25. Which algorithm is similar to SCAN scheduling techniques where that algorithm prevents the extra delay to traverse the end of the disk? 1 2 5 5
   (A) SSTF (B) C-SCAN
   (C) Look (D) C-Look

PART – B (5 × 10 = 50 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
26. a.i.	A user reads one record from file in 25μs, executes 100 instructions in 1 μs and write one record to file in 25 μs. Calculate CPU utilization for the scenario.	2	4	1	1
ii.	Determine the reasons for terminating the process.	5	4	1	1
ii.	What is pipe? What are the four issues must be considered while implementing pipe?	3	2	1	1
	(OR)				
b.	With the neat sketch, classify the states of process in operating system.	10	4	1	1
27. a.	In a bus station, five passengers P1, P2, P3, P4, P5 want to book a ticket. The passengers arrived at different time and all were waiting to get a book from 5th counter that were opened. The time taken by the customers to complete a transaction in the counter is given below: Note: to avoid the passengers to stand in the queue for longer time, a time quantum of sms was given to all the passengers.	10	4	2	2

Passenger ID	Arrival time	Burst time
P1	0	5
P2	1	2
P3	2	4
P4	3	7
P5	4	3