Process	Arrival time	Burst time
P1	0.0	12
P2	0.4	6
P3	0.7	3
P4	1.0	1

(i) Find the average waiting time and turnaround time for these process with the FCFS scheduling algorithm

(ii) Find the average waiting time and turnaround time for these process with SJF scheduling algorithm

(OR)

b. Explain in detail about rate monotonic scheduling and earliest deadline first scheduling with suitable example. 12 4 2 2

30. a. Describe a solution to the dining philosopher problem so that no race condition arises. 12 3 3 4

(OR)

b. Consider the following snapshot 12 5 3 4

Process	Allocate				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following using bankers algorithm

(i) What are the contents of matrix need?

(ii) Is the system in safe state?

(iii) If request for P1 arrives for (0, 4, 2, 0).

31. a. Explain the following allocation algorithm with example 12 3 4 2

(i) First fit

(ii) Best fit

(iii) Worst fit

(OR)

b. Consider the following reference strings 12 4 4 2

1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2

How many page faults would occur for the following replacement algorithm, assuming four and six frames respectively?

(i) LRU page replacement

(ii) FIFO page replacement

32. a. State and explain FCFS, SSTF and SCAN disk scheduling with example. 12 3 2 2

(OR)

b. What are the various disk space allocation methods? Explain any two in detail. 12 3 2 2

* * * * *

Reg. No.															

B.Tech. DEGREE EXAMINATION, MAY 2023

Fourth Semester

18CSC266J – OPERATING SYSTEMS

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

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 & Part - C** should be answered in answer booklet.

Time: 3 hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks) Marks BL CO PO

Answer **ALL** Questions

1. The main advantages of batch operating system is _____. 1 1 1 1

(A) Low cost (B) Multiple users can share the batch system

(C) Easy debug (D) Suitable for managing small work

2. Operating system is not a 1 1 1 1

(A) System software (B) First loaded program by boot program

(C) Hardware software interface (D) Application software

3. Hardware interrupt is made by 1 1 1 1

(A) IRQ line (B) Interrupt handles

(C) Special instructions (D) Interrupt condition

4. Virtual machine is used for 1 1 1 1

(A) Utilization of memory (B) Running different operating systems simultaneously

(C) Frequently used program (D) Multithreading

5. Purpose of process scheduling is to _____ 1 1 2 1

(A) Maximize waiting time (B) Maximize throughput

(C) Maximize response time (D) Maximize turnaround time

6. Round Robin scheduling falls under the category of _____. 1 2 2 1

(A) Non-preemptive scheduling (B) Preemptive scheduling

(C) Multiple level queue scheduling (D) Priority scheduling

7. In real time operating system, _____. 1 2 2 1

(A) Kernel is not required (B) Process scheduling can be done only once

(C) All process must be serviced by its deadline period (D) All process have the same priority

8. A shell script is a file that contains 1 2 2 1
(A) Set of statements (B) Scheduling algorithm
(C) Interrupt routine (D) Sequence of operating system commands and shell commands

9. The hardware implementation which provides mutual exclusion is 1 1 3 1
(A) Counting semaphore (B) Binary semaphore
(C) Test and set lock (D) Scheduling algorithm

10. The reader-writer problem and its solutions, have been generalized to provide reader writer locks on some systems. The process wishing to modify the shared data must request the lock in _____. 1 1 3 1
(A) Read mode (B) Write mode
(C) Read and write mode (D) Exclusive mode

11. The circular wait condition can be prevented by _____. 1 2 3 1
(A) Defining a linear ordering of resources type (B) Using thread
(C) Using pipes (D) Thread and pipes

12. For non sharable resources like a printer, mutual exclusion _____. 1 2 3 1
(A) Must exist (B) Must not exist
(C) May exist (D) Partially exist

13. The last on the hierarchy scale of memory device is _____. 1 2 4 1
(A) Main memory (B) Secondary memory
(C) TLB (D) Flash drives

14. In contiguous memory allocation _____. 1 2 4 1
(A) Each process is contained in a single contiguous section of memory (B) All process are contained in a single contiguous section of memory
(C) The memory space is contiguous (D) The memory space is not contiguous

15. Internal fragmentation occurs when a _____. 1 2 4 1
(A) Memory area remain unused because it is too large to be allocated (B) Memory area remain unused because it is too small to be allocated
(C) More memory is allocated than requested by processor (D) Less memory is allocated than requested by processor

16. In virtual memory, swap space exist in _____. 1 2 4 1
(A) Cache (B) Registers
(C) RAM (D) Secondary storage

17. Which one of the following connects high-speed high-bandwidth device to memory subsystem and CPU? 1 1 5 1
(A) Expansion bus (B) PCI bus
(C) SCSI bus (D) External bus

18. After the completion of DMA transfer, the processor is notified by _____. 1 2 5 1
(A) Acknowledgement signal (B) Interrupt signal
(C) WMFC signal (D) Control signal

19. A file is a/an _____ data type. 1 2 5 1
(A) Abstract (B) Primitive
(C) Public (D) Private

20. The process of dividing a disk into sectors that the disk controller can read and write, before a disk can store data is known as _____. 1 1 5 1
(A) Partitioning (B) Swap space creation
(C) Low level formatting (D) Fragmentation

PART – B (5 × 4 = 20 Marks) Marks BL CO PO
Answer **ANY FIVE** Questions

21. Define process and explain the process states with neat diagram. 4 2 1 1

22. Explain the priority scheduling algorithm with suitable example and write the pros and cons. 4 3 2 2

23. Explain Peterson's solution for achieving mutual exclusion. 4 3 3 2

24. What is paging? Discuss basic paging technique in detail. 4 3 4 2

25. Discuss the difference between internal and external fragmentation. 5 3 5 2

26. Describe, using a good example, the effects of changing the Round Robin scheduling algorithms time quantum from fixed small number to fixed large number. 4 3 2 2

27. What is virtual memory? How it is implemented? Explain. 4 3 4 1

PART – C (5 × 12 = 60 Marks) Marks BL CO PO
Answer **ALL** Questions

28. a. Describe the features of the following types of operating systems structures. 12 3 1 2
(i) Layered approach
(ii) Micro kernel system structure

(OR)

b. Describe the fields in Process Control Block (PCB). What is context switch overhead? Explain with neat sketch. 12 3 1 2

29. a. Suppose the following processes arrive for execution at the times indicated. Each process will run the listed amount of time, in answering the questions use non-preemptive scheduling. 12 4 2 2