Reg. No.															

B.Tech. DEGREE EXAMINATION, JANUARY 2024

Fourth Semester

18CSC205J – OPERATING SYSTEMS

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

Answer **ALL** Questions

	Marks	BL	CO	PO
1. In Unix, which system call creates the new process? (A) fork ( ) (B) create ( ) (C) new ( ) (D) wait ( )	1	1	1	1
2. The ready state of a process is (A) When process is scheduled to run after some execution (B) When process is using the CPU (C) When the process are communicating among themselves (D) When process is unable to run until some task has been completed	1	2	1	1
3. Which system call returns the process identifier of a terminated child? (A) exit ( ) (B) wait ( ) (C) fork ( ) (D) get ( )	1	1	1	1
4. The address of the next instruction to be executed by the current process is provided by the _____. (A) CPU registers (B) Program counter (C) Process stack (D) Pipe	1	1	1	1
5. If a process fails, most OS will write the error information to a _____. (A) Another running process (B) New file (C) Log file (D) Exe file	1	2	2	1
6. The systems which allow only one process execution at a time, are called _____. (A) Uniprogramming systems (B) Unitasking systems (C) Uniprocessing systems (D) Time sharing systems	1	2	2	1
7. To access the services of operating system, the interface is provided by the _____. (A) API (B) System calls (C) Library (D) Assembly instruction	1	1	2	1

8. The number of processes completed per unit time is known as _____. 1 2 2 2
   (A) Output (B) Efficiency
   (C) Capacity (D) Throughput

9. CPU fetches the instructions from memory according to the value of _____. 1 1 3 1
   (A) Program counter (B) Status register
   (C) Instruction register (D) Program status word

10. Which one of the following is the address generated by CPU? 1 1 3 1
   (A) Physical address (B) Absolute address
   (C) Logical address (D) Byte address

11. The address of a page table in memory is pointed by _____. 1 2 3 1
   (A) Stack pointer (B) Page table base register
   (C) Page register (D) Program counter

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

13. Virtual memory is normally implemented by _____. 1 1 4 1
   (A) Demand paging (B) Buses
   (C) Virtualization (D) Partitioning

14. A page fault occurs when 1 1 4 1
   (A) A page gives inconsistent data (B) A page is invisible
   (C) A page is disrupted (D) A page cannot be accessed due to its absence from memory

15. A FIFO replacement algorithm associates with each page the _____. 1 3 4 2
   (A) Size of the page in memory (B) Time it was brought into memory
   (C) Page after and before it (D) Page after with modified page

16. The minimum number of frames to be allocated to a process is decided by the _____. 1 2 4 2
   (A) Instruction set architecture (B) The amount of available physical memory
   (C) Operating system (D) Process control block

17. _____ is a unique tag, usually a number which identifies the file within the file system. 1 2 5 1
   (A) File name (B) File type
   (C) File identifier (D) File version

18. File type can be represented by _____. 1 2 5 1
   (A) File name (B) File extension
   (C) File identifier (D) File version

19. What is mounting of the file system? 1 1 5 1

(A) Creating of a file system
(B) Deleting a file system
(C) Attaching portion of the file system into directory structure
(D) Removing the portion of file system from a directory structure

20. The data structure used for file directory is called _____. 1 1 5 1

(A) Mount table
(B) Hash table
(C) File table
(D) Process table

PART – B (5 × 4 = 20 Marks) Marks BL CO PO

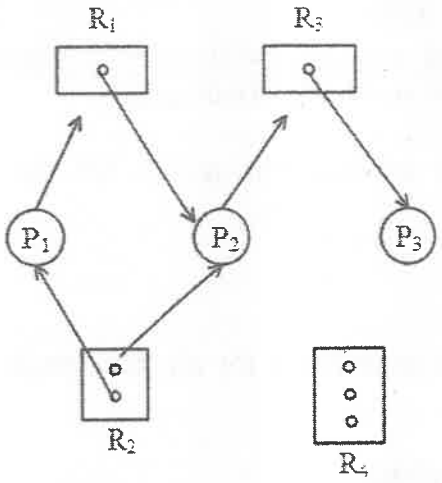
Answer **ANY FIVE** Questions

21. In the memory hierarchy, analyze how capacity, access time and cost are interrelated as one goes down the hierarchy, with a neat diagram. 4 2 1 3

22. Discuss about the objectives of OS that must be provided in order to control the execution of the application program. 4 2 2 2

23. List out the reasons, why a process gets terminated. 4 3 3 2

24. The following is a resource allocation graph, identify the number of resource instances and the process states that are holding and waiting for the resource. 4 3 3 2



25. Compare and contrast external fragmentation with internal fragmentation. 4 3 4 2

26. List out the common attributes of a file. 4 4 4 2

27. Justify the statement "when a layered structure is used for file system implementation, duplication of code is reduced", with the neat layered file system diagram. 4 3 5 2

PART – C (5 × 12 = 60 Marks) Marks BL CO PO

Answer **ALL** Questions

28. a. With a neat block diagram, discuss in detail about the various states of a process. 12 2 1 1

(OR)

b. Explain in detail about the evolution of operating system based on the context of serial processing, multiprocessing, timesharing and batch processing systems. | 12 | 3 | 1 | 3

29. a. Given: | 12 | 4 | 2 | 2

Process	Burst time (msc)	Priority
P_1	10	3
P_2	20	2
P_3	3	1
P_4	7	5
P_5	12	4

Consider the following five process, with the CPU burst time given in milliseconds. Consider FCFS, SJF, priority (priority value = 1 will be given the first priority), Round Robin (quantum = 3 ms) scheduling algorithm. Illustrate the scheduling using Gantt chart and find the algorithm which will give the minimum average waiting time and average turnaround time.

(OR)

b. Elaborate in detail, the necessary conditions for a deadlock to occur, with an example. Also discuss the conditions to be followed for deadlock detection and avoidance. | 12 | 3 | 2 | 1

30. a. Illustrate with suitable about fixed and dynamic partitioning. | 12 | 1 | 3 | 1

(OR)

b. Explain in detail about paging and segmentation with respect to address translation with a neat example and necessary diagram. | 12 | 4 | 3 | 2

31. a. Preform the following page replacement policy for the given page sequence: | 12 | 3 | 4 | 2

2 3 2 1 5 2 4 5 3 2 5 2

(i) Optimal
(ii) LRU
(iii) FIOF, also find the page faults for all three page replacement policies

(OR)

b. Identify "the technique of loading pages into memory only as they are needed". And also explain in detail about its basic concepts and the steps in handling a page fault with a neat block diagram. | 12 | 2 | 4 | 2

32. a. Discuss in detail about the various file allocation methods. | 12 | 2 | 5 | 1

(OR)

b. Explain in detail about the different levels of directory structure. | 12 | 3 | 5 | 1

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