2023/TDC(CBCS)/ODD/SEM/
CSCHCC-303T/087

TDC (CBCS) Odd Semester Exam., 2023

COMPUTER SCIENCE

(Honours)

(3rd Semester)

Course No. : CSCHCC-303T

(Operating Systems)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *ten* questions, selecting any *two* from each Unit : 2×10=20

UNIT—I

1. Define operating system and its role.
2. What are system calls? What are the different categories of the system calls?
3. What is the purpose of a system call and system programs?

UNIT—II

4. What do you mean by PCB? Where is it used?

5. What do you mean by long-term, short-term and medium-term schedulers?

6. List out the benefits and challenges of thread handling.

UNIT—III

7. What are the two options for breaking a deadlock?

8. What are semaphores?

9. What is a critical section problem?

UNIT—IV

10. What is paging and swapping?

11. What are the causes for external fragmentation?

12. What is the difference between physical and logical address?

UNIT—V

13. What are the techniques used to prevent unauthorized access of the operating system and its resources?

14. What is the role of protection?

15. What are the common tasks of device management?

SECTION—B

Answer *five* questions, selecting any *one* from each Unit : 10×5=50

UNIT—I

16. *(a)* Distinguish among multiprogramming systems, multitasking systems and multiprocessor systems. 6

(b) What is distributed operating system? What are the advantages of distributed operating system? 4

17. *(a)* Explain distinguished features of time sharing system and parallel processing. 5

(b) What are the different categories of system programs? Explain. 5

UNIT—II

18. Consider the following data with burst-time given in milliseconds :

Process	*Burst-time*	*Priority*
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The process has arrived in the order *P1*, *P2*, *P3*, *P4*, *P5* all at time 0.

(a) Draw Gantt charts for execution of these processes using FCFS, a nonpreemptive priority and RR (quantum = 1) scheduling.

(b) What is the turnaround time and waiting time of each process for each of the scheduling algorithms?

19. For the following set of processes, find the average waiting time and average turn-around time using Gantt chart for—

(a) SJF preemptive;

(b) SJF nonpreemptive :

Process	*Arrival-time* (in sec.)	*Burst-time* (in sec.)
P1	0	4
P2	1	2
P3	2	5
P4	3	4

UNIT—III

20. *(a)* What is deadlock? Explain the necessary conditions for its occurrence. 5

(b) What is dining philosophers problem? Discuss the solution to dining philosophers problem. 5

21. Explain Banker's deadlock-avoidance algorithm with an illustration. 10

UNIT—IV

22. *(a)* 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 occur while using FCFS and LRU, using 3 frames? 6

(b) What is demand paging? Explain. 4

23. *(a)* Explain paging scheme of memory management. What hardware support is needed for its implementation? 4

(b) The available space list of a computer memory is specified as follows :

Start Address	*Block Address in Words*
100	50
200	150
450	600
1200	400

Determine the available space list after allocating the space for the stream of request consisting of the following block sizes : 25, 100, 250, 200, 100, 150

Use—

(i) FIRST FIT;

(ii) BEST FIT;

(iii) WORST FIT algorithms. 6

UNIT—V

24. Explain the different file allocation methods with their relative advantages and disadvantages.

25. What do you mean by directory structure? Also discuss different types of directory structures with their relative advantages and disadvantages.

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