Total No. of printed pages = 6

63/2 (SEM-1) CSIT 1.3

2021

(held in 2022)

CSIT

(Theory Paper)

Paper Code : CSIT-1.3

(Operating Systems)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Which of the following is a CPU scheduling algorithm ? 1

   (a) Round Robin (b) Paging

   (c) Throughput (d) SCAN

2. In time sharing operating systems, when the assigned time slot to a process is completed then the process switches from _____ state to ready state. 1

   (a) Waiting (b) Running

   (c) New (d) Terminate

[Turn over

3. CPU scheduling in the basis of _____. 1

(a) Larger memory sized systems

(b) Multiprocessor systems

(c) Multiprogramming OS

(d) Segmentation.

4. After completion of I/O operation the process switches to _____ state. 1

(a) New (b) Ready

(c) Running (d) Waiting

5. The deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition never exists. 1

(a) Operating System

(b) Resources

(c) System storage state

(d) Resource allocation state

6. Which of the following is the extension of the file created on "Notepad" ? 1

(a) .xls (b) .docx

(c) .pdf (d) .txt

7. Define multitasking. 2

8. What is dispatch latency ? 2

9. What is operating system and what are its functions ? 2

10. Define context switch. 2

11. What does CPU scheduler do ? 2

Answer any *six* questions from Q 12 to Q 20 : 5×6=30

12. Apply FIFO and LRU page replacement algorithm to the following reference string to find out the number of page faults occured for the above algorithms while considering 4 page frames : 5

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

13. Consider the following set of processes, with their arrival time and length of the CPU burst given in miliseconds : 5

Processes	Burst Time	Arrival Time
P_0	6	0
P_1	3	1
P_2	4	2
P_3	2	3
P_4	8	4

3. Draw two Gantt charts to illustrate the execution of these processes using FCFS and SJF (preemptive) algorithms and find out the waiting time and turn around time of each process for both the algorithms respectively.

14. A disk drive has 500 cylinders, numbered from 0 to 499, the head is currently serving at 145. The list of pending request is 82, 120, 450, 300, 60, 250. Starting from the current head position, draw the graph and find out the total cylinder jumps that the disk arm moves to satisfy all the pending requests for FCFS and SSTF disk scheduling algorithms. 5

15. Explain deadlocks and the necessary conditions for deadlock to arise. 5

16. Describe when a system can be said to be in a safe state. 5

17. Explain critical section problem and the requirements for its solution. 5

18. Write the safety and resource request algorithm in Banker's algorithm. 5

19. Explain Fragmentation of memory. 5

20. Explain any five file operations. 5

100

Answer any *two* from the following : 10×2=20

21. Write how deadlocks can be avoided. The following is a smapshot of resource allocation of a system in certain time : 10

Processes	Allocation	Max	Available
	A B C	A B C	A B C
P_1	0 1 0	7 5 3	3 3 2
P_2	2 0 0	3 2 2	
P_3	3 0 2	9 0 2	
P_4	2 1 1	2 2 2	
P_5	0 0 2	4 3 3	

Where A, B, C are different resource types. Find the contents of the matrix "Need". Determine whether the system is in a safe state or not by applying Banker's algorithm. Write the safe sequence. If a request from process P_2 arrives for (1, 0, 2) numbers of more instances of A, B, C respectively, then can the request be granted immediately ?

22. How can deadlock be detected when there are several instances of each resource type and how can the system be recovered from deadlock. 10

23. Explain segmentation and its basic method. 10

Answer any *one* from the following : 14×1=14

24. Describe paging and its basic method. 14

25. Describe demand paging and its basic concepts. 14