C

Question Paper Code: 53805

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Third Semester

Computer Science and Engineering

15UIT305 OPERATING SYSTEMS

(Common to Information Technology)

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The number of processes completed per unit time is known as   CO1- U

    (a) Output   (b) Throughput   (c) Efficiency   (d) Capacity

2. Termination of the process terminates   CO2- U

    (a) First thread of the process   (b) First two thread of the process

    (c) All threads within the process   (d) No thread within the process

3. If the resources are always preempted from the same process, _____can   CO3- U
    occur.

    (a) Starvation   (b) Deadlock   (c) System crash   (d) Aging

4. Thrashing _____ the CPU utilization.   CO4- U

    (a) Increases   (b) Keeps constant   (c) Infinity   (d) Decreases

5. What is raw disk?   CO5- U

    (a) Disk without file system   (b) Disk lacking logical file system

    (c) Disk having file system   (d) Empty disk

PART – B (5 x 3= 15 Marks)

6. Define operating system. Write its services.   CO1- U

7. Develop synchronization code for readers and writers problem.   CO2- App

8. Give four necessary conditions for deadlock to occur.   CO3- U

9. With a neat sketch, explain the concept of demand paging.   CO4- U

10. How can the index blocks be implemented in the indexed allocation scheme?   CO5 -U

PART – C (5 x 16= 80 Marks)

11. (a) Define process and co-operating process. Draw process state diagram   CO1- U   (16)
and explain all states. With a neat sketch, explain the concept of inter
process communications.

Or

(b) With neat sketches, explain distributed, clustered, multi processor and   CO1- U   (16)
real time systems.

12. (a) Consider the following set of processes, calculate average waiting time   CO2- App   (16)
and average turn around time using FCFS, SJF, Priority (Highest
number implies highest priority) and RR (time quantum = 5sec) CPU
scheduling algorithms. All the processes are arrived in the following
order at time 0 sec.

Process	Burst Time(sec)	Priority
A	10	5
B	5	10
C	8	4
D	13	8

Or

(b) Define critical section. What are the minimum requirements that   CO2- App   (16)
should be satisfied by a solution to critical section? Explain Peterson
algorithm for two process synchronization to critical section problem.

13. (a) Consider a system with 5 processes (P_0,P_1,P_2,P_3, P_4) and 3 resource   CO3- U   (16)
types such as 7 instances of A, 2 instances of B, 6 instances of C.
Resource-allocation state at time t_0:

Process	Allocation			Maximum		
	A	B	C	A	B	C
P_0	0	1	0	1	1	0
P_1	2	0	0	4	0	2
P_2	3	0	3	4	0	3
P_3	2	1	1	3	1	1
P_4	0	0	2	0	0	4

(i) Write the Available and Need matrix.

(ii) Is the system in a deadlocked state? If yes, justify your answer for
deadlock. If not, which sequence results in finish[i] == true for all P_i ?

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(b) Define paging. With neat diagram, explain hardware support for paging and how logical address is translated into physical address. CO3- U (16)

14. (a) Consider the following page reference string
    5, 6, 7, 0, 5, 1, 2, 0, 5, 3, 0, 4, 2, 3, 6, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
    How many page faults would occur for the following replacement algorithms?
    LRU, FIFO and Optimal
    Assuming three frames that all frames are initially empty. CO4-U (16)

Or

(b) Define file access and directory. Explain the concept of sequential and direct access methods. Explain one level, two level and tree structured directories. CO4-U (16)

15. (a) A hard disk having 500 cylinders / tracks, numbered from 0 to 499. The drive is currently serving the request at cylinder 143, and the previous request was at cylinder 125. The status of the queue is as follows: 86, 470, 13, 177, 448, 150, 102, 175, 130 What is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk -scheduling algorithms? CO5- U (16)

(i) FCFS

(ii) C-SCAN

(iii) LOOK

(iv) SSTF

Or

(b) Summarize the importance of man storage structure. CO5- U (16)

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