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**Question Paper Code: 93305**

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

Third Semester

Computer Science Engineering

19UCS305–OPERATING SYSTEMS

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. For reading input, which of the following system call is used? CO1- R  
(a) write      (b) rd.      (c) read      (d) change.
2. What is interprocess communication? CO1- R  
(a) communication within the process  
(b) communication between two process  
(c) communication between two threads of same process  
(d) none of the mentioned
3. Identify either the requested physical address: 1280 is a valid address or not, CO2- App  
Relocation register:1025 limit register:250.  
(a) Valid address      (b) Invalid address  
(c) CPU cannot predict      (d) None of the above
4. Semaphore is a/an \_\_\_\_\_ to solve the critical section problem. CO2- R  
(a) hardware for a system      (b) special program for a system  
(c) integer variable      (d) none of the mentioned
5. \_\_\_\_\_ is a unique tag, usually a number identifies the file within the file CO2- R  
system.  
(a) File identifier      (b) File name  
(c) File type      (d) None of the mentioned

PART – B (5 x 3= 15 Marks)

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|---|--------|
| 6. Identify the difference between mainframe and desktop operating system | CO1- U |
| 7. Differentiate primitive and non-primitive scheduling.                  | CO1- U |
| 8. Distinguish between internal fragmentation and external fragmentation. | CO2- U |
| 9. Define mutual exclusion in critical section problem                    | CO2- U |
| 10. What are the Access methods available in file?.                       | CO6- U |

PART – C (5 x 16= 80Marks)

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|--|----------|------|
| 11. (a) Explain in detail about the following types of operating systems.  | CO1- U   | (16) |
| (i) Mainframe system   |          |      |
| (ii) Desktop system  |          |      |
| (iii) Multi processor system   |          |      |
| Or   |          |      |
| (b) Discuss in detail about various operating system components  | CO1- U   | (16) |
| 12. (a) Explain in detail about inter processor communication  | CO2- U   | (16) |
| Or   |          |      |
| (b) Explain the types of threads   | CO2- U   | (16) |
| 13. (a) The order of pages needed is given identify the page fault of the following algorithms. (i) <b>FIFO</b> (ii) <b>Optimal</b> (iii) <b>LRU</b> | CO4- App | (16) |
| Pages needed: 7 0 1 2 0 3 0 4 2 3 0  |          |      |
| Page frame is 3  |          |      |
| Or   |          |      |
| (b) The order of pages needed is given identify the page fault of the following algorithms. (i) <b>FIFO</b> (ii) <b>Optimal</b>                      | CO4- App | (16) |
| Pages needed: 1 2 3 2 1 5 2 1 6 2 5 6 3 1 3  |          |      |
| 6 1 2 4 3  |          |      |
| Page frame is 4  |          |      |

14. (a) The operating system contains 3 resources, the number of instance of each resource type are 7,7,10. The current resource allocation state is as shown below. CO5- App (16)

Process	Current Allocation			Maximum Need		
	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8
P2	2	0	3	4	3	3
P3	1	2	4	3	4	4

Is the current allocation in a safe state?

Or

- (b) Consider the following system snapshot using data structures in the Banker's algorithm, with resources A,B,C and D and process P0 to P4: CO5- App (16)

	Max	Allocation	Available
	ABCD	ABCD	ABCD
PO	6012	4001	3211
P1	1750	1100	
P2	2356	1254	
P3	1653	0633	
P4	1656	0212	

Using Banker's algorithm, answer the following questions:

- How many resources of type A, B, C and D are there?
  - What are the contents of the need matrix?
  - Is the system in a safe state? Why?
  - If a request from process P4 arrives for additional resources of (1,2,0,0), can the Banker's algorithm grant the request immediately? Show the new system state and other criteria.
15. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 through 4999. The drive is serving a request at cylinder 143. The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the head position 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? FCFS, SSTF, SCAN. CO6- App (16)

Or

- (b) Suppose that a disk drive has 5000 cylinders, numbered 0 through 4999. The drive is serving a request at cylinder 143. The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the head position 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? LOOK, C-SCAN, C-LOOK.. CO6- App (16)