B.E. (Computer Science Engineering) Fourth Semester (C.B.S.)

Operating System

P. Pages : 3 **NIR/KW/18/3380**

Time : Three Hours * 1 3 1 1 * Max. Marks :

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain following types of operating system. **8**

i) Multiprogramming OS ii) Multitasking OS
iii) Real time OS iv) Distributed System

b) Define operating system. What are different services offered by OS? **5**

OR

2. a) Explain different levels of Design & Implementation of OS. Give its object & typical operation that OS perform at different levels. **7**

b) Explain different types of system call in detail. **6**

3. a) Explain various directory structure of operating system. **6**

b) Explain following Disk Space allocation methods. **8**

i) Contiguous Allocation (Dynamic Allocation)
ii) Index Allocation
iii) Linked allocation

OR

4. a) Suppose that the head of a moving head disk with 5000 tracks numbered 0 to 4999 is currently serving a request at track 143 & has just finished a request at queue of request is kept in the FIFO order-86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total number of head movements needed to satisfy these requests for the following disk scheduling algorithms- **8**

i) FCFS ii) SSTF

iii) SCAN iv) LOOK.

b) Write short note on scheduling Queues. **6**

5. a) Explain in detail interprocess communication. **4**

b) Write short note on following: **6**
i) Context Switching ii) Process Creation
iii) Process termination

c) What is CPU schedular? **3**

OR

6. a) Consider 5 processes P_1, P_2, P_3, P_4, and P_5 with length of CPU burst time. Find out average waiting time & average turnaround time for following: **8**
i) FCFS ii) RR (Slice=2ms)
iii) SJF (Preemptive & non-preemptive)

Process	Average Time	Burst Time
P_1	0	3
P_2	1	5
P_3	2	2
P_4	3	5
P_5	4	5

b) What are the different scheduling criteria for selecting scheduling algorithm? **5**

7. a) Explain paging and its implementation. What hardware is required for paging. **8**

b) Consider the following segment table. **5**

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?
i) 0, 430 ii) 1, 10
iii) 1, 11 iv) 2, 500
v) 3, 400

OR

8. a) Explain the need of virtual memory and how it is implemented. **7**

b) Consider following page reference string- **6**
4 1 2 1 5 4 1 2 1 5
How many page fault would occur for the following page replacement algorithms assuming 3 frames?
i) FIFO ii) LRU
iii) Optimal

9. a) What is semaphore? What is the difference between binary & counting semaphore. **7**

b) Give the solution to Dining philosopher problem using monitor. **7**

OR

10. a) What are the various solution to critical section problem. **5**

b) Write short note on monitors. **5**

c) What is Trashing? What is the cause of trashing. **4**

11. a) Define Deadlock. To arise deadlock in system what are necessary conditions it should meet? **7**

b) Write a short note on resource allocation graph. **7**

OR

12. a) Write a short note on access matrix implementation. **6**

b) Consider following snapshot of a system Available

A B C D

1 5 2 0

Process	Allocation				MAX			
	A	B	C	D	A	B	C	D
P_0 →	0	0	1	2	0	0	1	2
P_1 →	1	0	0	0	1	7	5	0
P_2 →	1	3	5	4	2	3	5	6
P_3 →	0	6	3	2	0	6	5	2
P_4 →	0	0	1	4	0	6	5	6

i) What is the content of matrix need? **2**

ii) Is the system in safe state? Prove it. **3**

iii) If a request from process P_1 arrives for (0, 4, 2, 0) can the request be immediately granted? why? **3**

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