Printed Page:- Subject Code:- ACSE0403B

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2021 - 2022)

Subject: Operating Systems

Time: 3 Hours Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 mark each & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 20

1. Attempt all parts:-

1-a. For real time operating systems, interrupt latency should be (CO1) 1

(a) Maximum

(b) Zero

(c) Minimal

(d) none of the mentioned above

1-b. A technique that allows more than one program to be ready for execution and provides the ability to switch from one process to another (CO1) 1

(a) multitasking

(b) multiprocessing

(c) time sharing

(d) multiprogramming

1-c. What is ‘Aging’? (CO2) 1

(a) keeping track of cache contents

(b) keeping track of what pages are currently residing in memory

(c) keeping track of how many times a given page is referenced

(d) increasing the priority of jobs to ensure termination in a finite time

1-d. A single thread of control allows the process to perform (CO2) 1

(a) only one task at a time

(b) multiple tasks at a time

(c) only two tasks at a time

(d) all of the mentioned above

1-e. The number of resources requested by a process : (CO3) 1

(a) must always be less than the total number of resources available in the system

(b) must always be equal to the total number of resources available in the system

(c) must not exceed the total number of resources available in the system

(d) must exceed the total number of resources available in the system

1-f. Mutual exclusion can be provided by (CO3) 1

(a) mutex locks

(b) binary semaphores

(c) both mutex locks and binary semaphores

(d) none of the mentioned above

1-g. Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called? (CO4) 1

(a) fragmentation
(b) paging
(c) mapping
(d) none of the mentioned

1-h. Consider six memory partitions of sizes 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB, where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. If the best fit algorithm is used, which partitions are NOT allotted to any process? (CO4) 1

(a) 200 KB and 300 KB
(b) 200 KB and 250 KB
(c) 250 KB and 300 KB
(d) 300 KB and 400 KB

1-i. File management function of the operating system includes which of the following (CO5) 1
i) File creation and deletion
ii) Disk scheduling
iii) Directory creation
iv)Mapping file in secondary storage

(a) i, ii and iii only
(b) i, iii and iv only
(c) ii, iii and iv only
(d) All i, ii, iii and iv

1-j. If a process needs I/O to or from a disk, and if the drive or controller is busy then what will happen? (CO5) 1

(a) the request will be placed in the queue of pending requests for that drive
(b) the request will not be processed and will be ignored completely
(c) the request will be not be placed
(d) none of the mentioned above

2. Attempt all parts:-

2.a. Describe in detail about system calls and system programs (CO1) 2

2.b. Differentiate Pre-emptive and Non-preemptive scheduling giving the application of each of them. (CO2) 2

2.c. What is semaphore? Mention its importance in operating system. (CO3) 2

2.d. What is the need of virtual memory? (CO4) 2

2.e. Compare SCAN and C SCAN. (CO5) 2

SECTION B 30

3. Answer any <u>five</u> of the following:-

3-a. What is operating system? Explain the components of operating System in detail. (CO1) 6

3-b. Explain the differences between multiprocessor and multi-tasking system with their advantages and disadvantages. (CO1) 6

3-c. With the help of Diagram, Describe the action taken by kernel to context switch between the process. (CO2) 6

3-d. Explain why Scheduling is necessary. Discuss the five different scheduling criteria's used in computing scheduling mechanism. (CO2) 6

3.e. Elaborate the Reader-Writer problem in detail. (CO3) 6

3.f. What is fragmentation? Explain its types and their advantages & disadvantages. (CO4) 6

3.g. Suppose the order of request is given as (82,170,43,140,24,16,190) and current position of 6

Read/Write head is at 50. Use FCFS disk scheduling algorithm to calculate the total seek time? (CO5)

SECTION C 50

4. Answer any one of the following:-

4-a. Write a short note on (CO1) 10
1. Multithreaded
2. Real time system
3. Distributed system

4-b. Define the different layers of operating system? Explain them. (CO1) 10

5. Answer any one of the following:-

5-a. a) Define Process? With a suitable diagram explain process State diagram? b) Explain about process schedulers? (CO2) 10

5-b. Describe the four situations under which CPU scheduling decisions take place. Explain the algorithmic evaluation in CPU scheduling. (CO2) 10

6. Answer any one of the following:-

6-a. Explain the necessary conditions for a deadlock to occur with example. How deadlocks can be recovered? (CO3) 10

6-b. Write algorithm for Dining Philosopher problem and discuss the approaches for reducing deadlock condition. (CO3) 10

7. Answer any one of the following:-

7-a. Discuss the following page replacement algorithm with an example - (CO4) 10
i. Optimal
ii .LRU

7-b. Explain with the help of supporting diagram how TLB improves the performance of a demand paging system. (CO4) 10

8. Answer any one of the following:-

8-a. Explain the Direct Memory Access in detail. (CO5) 10

8-b. What are LINUX distributions or Distros? Explain any five in brief. (CO5) 10