Printed Page:- **Subject Code:- ACSE0403A**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - CARRY OVER THEORY EXAMINATION - APRIL 2023

Subject: Operating System

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *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. The first batch operating system was developed in the by General Motors for use on an IBM 701. (CO1) 1

(a) mid 1940's

(b) mid 1950's

(c) mid 1970's

(d) mid 1960's

1-b. State True or False. i) In spooling high speed device like a disk is interposed between running program and low-speed device in Input/output. 1

ii) By using spooling for example instead of writing directly to a printer, outputs are written to the disk. (CO1)

(a) i-True, ii-False

(b) i-True, ii-True

(c) i-False, ii-True

(d) i-False, ii-False

1-c. The address of the next instruction to be executed by the current process is provided by the (CO2) 1

(a) CPU registers

(b) Program counter

(c) Process stack

(d) Pipe

1-d. Which of the following scheduling algorithms is preemptive scheduling? (CO2) 1

(a) SRTN Scheduling

(b) FCFS

(c) SJF

(d) Network Scheduling

1-e. Process synchronization can be done on (CO3) 1

(a) hardware level

(b) software level

(c) both hardware and software level

(d) none of the mentioned

1-f. The content of the matrix Need is (CO3) 1

(a) Allocation – Available

(b) Max – Available

(c) Max – Allocation

(d) Allocation – Max

1-g. The first fit, best fit and worst fit are strategies to select a (CO4) 1

(a) process from a queue to put in memory

(b) processor to run the next process

(c) free hole from a set of available holes

(d) All of these

1-h. When the entries in the segment tables of two different processes point to the same physical location _____ (CO4) 1

(a) the segments are invalid

(b) the processes get blocked

(c) segments are shared

(d) all of the mentioned

1-i. The directory can be viewed as a what, that translates file names into their 1

directory entries. (CO5)

(a) symbol table

(b) partition

(c) swap space

(d) cache

1-j. Which one is true for the tree structured directories ? (CO5) 1

(a) the tree has the stem directory

(b) the tree has the leaf directory

(c) the tree has the root directory

(d) all of the mentioned

2. Attempt all parts:-

2.a. What do you mean by boot strapping process? (CO1) 2

2.b. Explain Process State Transition diagram. (CO2) 2

2.c. Write necessary conditions for occurring deadlock in a system? (CO3) 2

2.d. What do you mean by compaction technique? (CO4) 2

2.e. Define Bit Map File. (CO5) 2

SECTION B **30**

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

3-a. Describe the layered architecture operating system with its advantages and disadvantages. (CO1) 6

3-b. Define Kernel, system programs, and application programs. (CO1) 6

3-c. Distinguish between CPU bound and, I/O bound processes. (CO2) 6

3-d. What are the different types of scheduling? Explain the advantages of Long Term Scheduling and compare it with short term scheduling. (CO2) 6

Question Instruction

ProcessName	Arrival Time	CPU Burst Time
A	0	4
B	1	3
D	3	1
C	2	6

3.e. Explain the various methods for deadlock detection and recovery. (CO3) 6

3.f. What is the cause of Thrashing? How does system detect thrashing? Once it detects thrashing what can system do to eliminate this problem? (CO4) 6

3.g. Explain how file system protection and security is handled by operating 6

system? (CO5)

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. Discuss the monolithic and microkernel architecture of OS. What are their advantages and disadvantages? (CO1) 10

4-b. Distinguish between : i) Process and Program ii) Multiprogramming and multiprocessing iii) Symmetric and Asymmetric Multiprocessing (CO1) 10

5. Answer any <u>one</u> of the following:-

5-a. What are the various performance criteria of CPU scheduling. Distinguish between scheduler and dispatcher. (CO2) 10

5-b. What do you mean by PCB? Where is it used? What are its contents? Explain it with the help of block diagram. (CO2) 10

6. Answer any <u>one</u> of the following:-

6-a. Let us consider the following snapshot : • Determine the total amount of instances of each resource type 10

• What is the content of matrix need?

• Is the system in a safe state or not?

• If a request from process p3 arrives for (0, 2, 0, 0) (CO3)

Question Instruction

Process	Allocation				Maximum				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P0	3	1	0	0	4	6	5	0	4	2	0	0
P1	0	0	1	2	0	0	1	2				
P2	1	3	3	4	6	6	5	6				
P3	2	3	5	4	4	3	5	6				
P4	0	0	3	2	0	6	5	2				

6-b. Describe the Bounded - buffer problem and give a solution for the same using semaphores. Write the structure of producer and consumer processes. (CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. Discuss merits and demerits of multilevel paging and inverted page tables. (CO4) 10

7-b. What do you understand by fragmentation? What are different techniques to remove fragmentation in case of multiprogramming with fixed and variable partition? (CO4) 10

8. Answer any <u>one</u> of the following:-

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8-a.	Consider the following disk request sequence for a disk with 100 tracks 98, 137, 122, 183, 14, 133, 65, 78. Head pointer starting at 54 and moving towards track 0. Find the number of head movements in cylinders using LOOK, C-LOOK, SCAN and C-SCAN disk scheduling algorithms. (CO5)	10
8-b.	Explain in detail about single-level, two-level and tree-structured directories. What do you mean by inode in UNIX? (CO5)	10