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Subject Code:- BMICA0304

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA (Integrated)

SEM: III - THEORY EXAMINATION (2024- 2025)

Subject: Operating Systems

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. What is true about OS?[CO1, K1] 1

(a) An operating system (OS) is a collection of software

(b) The operating system is a vital component of the system software in a computer system.

(c) An Operating System (OS) is an interface between a computer user and computer hardware.

(d) All of the above

1-b. In Round Robin Scheduling, Each process is provided a fix time to execute, it is called a?[CO1, K2] 1

(a) Batch Time

(b) Job Time

(c) quantum

(d) Period

1-c. In which state, processor executes its instructions?[CO2, K2] 1

(a) Ready

(b) Waiting

(c) Running

(d) Start

1-d. A state is safe, if _____[CO2, K2] 1

(a) the system does not crash due to deadlock occurrence

(b) the system can allocate resources to each process in some order and still avoid a deadlock

(c) the state keeps the system protected and safe

(d) all of the mentioned

1-e. The index contains _____[CO3, K2] 1

(a) names of all contents of file

(b) pointers to each page

(c) pointers to the various blocks

(d) all of the mentioned

1-f. Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called?[CO3, K2] 1

(a) fragmentation

(b) paging

(c) mapping

(d) none of the mentioned

1-g. Which command shows some attributes of a process?[CO4, K2] 1

(a) pid

(b) $$

(c) ps

(d) HOME

1-h. What does the man command do?[CO4, K2] 1

(a) Manages directories

(b) Provides documentation or manual pages

(c) Manages users

(d) Monitors system performance

1-i. How to display the value of a variable[CO5, K2] 1

(a) echo #var_name

(b) echo $var_name

(c) $var_name

(d) echo var_name

1-j. The positional parameters are_____[CO5, K2] 1

(a) special variables and patterns

(b) pattern matching parameters

(c) special variables to read user input

(d) From the command lines, the special variables for assigning arguments

2. Attempt all parts:-

2.a. Define Kernel, system programs, and application programs.[CO1, K2] 2

2.b.	Define deadlock prevention[CO2, K2]	2
2.c.	Define dynamic partitioning in memory allocation.[CO3, K3]	2
2.d.	In Linux, how do pipes and filters work?[CO4, K3]	2
2.e.	What do you mean by root and ordinary user? [CO5, K2]	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What are the five major activities of an operating system with regard to file management.[CO1, K2]	6
3-b.	Explain why Scheduling is necessary. Discuss the five different scheduling criteria used in computing scheduling mechanism.[CO1, K2]	6
3-c.	Differentiate between binary semaphore and counting semaphore with examples.[CO2, K3]	6
3-d.	Explain the term synchronization in detail with an example.[CO2, K3]	6
3.e.	Let us Consider the following page reference string.1, 2, 3, 4, 2 ,1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 and number of free frames is 3. Find the number of page faults by using Least Recently Used (LRU) algorithm. [CO3, K4]	6
3.f.	Explain any six networking commands with the help of examples.[CO4, K3]	6
3.g.	Explain how a WHILE LOOP construct is used in shell script. Elaborate with example.[CO5, K3]	6

SECTION-C 50

4. Answer any one of the following:-

4-a. Read the instructions carefully and answer the following questions[CO1, K4] 10

Consider the set of 5 processes whose arrival time and burst time are given below –

Process Id	Arrival Time	Burst Time
P1	0	3
P2	1	2
P3	2	1
P4	3	4
P5	4	5
P6	5	2

Calculate average waiting time and average turnaround time for-

(i) FCFS scheduling
(ii) SJF scheduling

4-b. Consider the set of 5 processes whose arrival time and burst time are given below- [CO1, K4] 10

Process Id	Arrival time	Burst time	Priority
P1	0	4	2
P2	1	3	3
P3	2	1	4
P4	3	5	5
P5	4	2	5

If the CPU scheduling policy is priority preemptive, calculate the average waiting time and average turn around time. (Higher number represents higher priority)

5. Answer any one of the following:-

5-a. Explain the advantages and disadvantages of bounded buffer.[CO4, K4] 10

5-b. Explain three requirements that a solution to critical–section problem must satisfy.[CO2, K4] 10

6. Answer any one of the following:-

6-a. Suppose a disk contains 200 tracks (0-199) and the request queue contains track no: 93, 176, 42, 148, 27, 14,180. The current position of the read/write head is 55 moving towards larger cylinder numbers on its servicing pass. calculate the total number of track movements of read/write head using FCFS , SSTF scheduling.[CO3, K4] 10

6-b. Let us consider five fixed memory partitions of 100kb,200bk,400kb,500kb,600kb (in a order). How would First Fit, Best Fit, Worst Fit algorithm placed processes of 230kb,410kb,190kb and 478kb (in a order)? Which Algorithm the most efficient use of memory.[CO3, K4] 10

7. Answer any one of the following:-

7-a. Explain the cat command in Linux with all its options in detail. Elaborate with examples.[CO4, K3] 10

7-b. Explain File permissions in Linux in detail with examples.[CO4, K3] 10

8. Answer any one of the following:-

8-a. Write a shell script to print first 10 numbers using a loop construct. Starting number is 1.[CO5, K3] 10

8-b. Differentiate between BREAK and CONTINUE construct in Linux with the help of examples.[CO5, K3] 10