

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4892

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Unique Paper Code : 2342202401

Name of the Paper : Operating Systems

**Name of the Course : B.A. (Prog)/B.Sc.Non-Major
(NEP-UGCF-2024)**

Semester : IV

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section-A** is compulsory.
3. Attempt any **4** questions from **Section-B**.
4. Parts of a question must be answered together.

Section-A

1. (a) Differentiate between User mode and Kernel mode execution of a process. (3)

P.T.O.

- (b) Explain the purpose of system programs. (3)
- (c) What is the context switching? (3)
- (d) What is the Compaction? (3)
- (e) What is the drawback of priority scheduling algorithm? How it can be resolved? (3)
- (f) What are the three different types of process scheduler in operating system? (3)
- (g) What is convoy effect in CPU scheduling? (3)
- (h) Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames. (3)
 - (i) How many bits are there in the logical address?
 - (ii) How many bits are required to address each word in a frame?

(i) Distinguish between absolute and relative path name. (3)

(j) Explain the use of UNIX commands : (3)

(i) mkdir

(ii) pwd

(iii) cd

Section-B

2. (a) (i) What are the goals of operating System?

Explain Batch Operating System, multiprocessor system and real time Operating with suitable example?

(ii) List any two different types of mass storage devices. Explain seek time, rotational latency time, and data transfer rate in the disk?

(4+4)

(b) (i) Briefly explain the layered approach and discuss its advantages and disadvantages for system design.

(ii) What are system calls? Explain different types of system calls. (4+3)

3. (a) Consider the following set of processes, with the length of the CPU burst time given in milliseconds : (8)

Process	Arrival time	Burst Time
P1	0	7
P2	1	5
P3	2	3
P4	3	1
P5	4	2
P6	5	4

(i) Draw Gantt chart that illustrate the execution schedule of these processes using preemptive SJF scheduling algorithm.

(ii) Calculate the turnaround time and waiting time of each process. Also compute average turnaround time and average waiting time.

(b) (i) What is PCB? What information is contained in the PCB?

(ii) Explain the different states of a Process with a suitable diagram? (3+4)

4. (a) Given four memory partitions of 100KB, 500KB, 200KB and 600KB (in order), how would each of the first fit, best fit and worst fit algorithms place processes of 212KB, 417KB, 112KB and 426KB (in order)? (6)

(b) (i) What is Demand Paging in Operating System?
Explain its advantages and disadvantages.

(ii) Consider a system which has main memory access time of 100ns and TLB access time of 20ns, and TLB hit ratio of 95%. What will be the effective memory access time with TLB and without TLB? (5+4)

5. (a) (i) Explain the purpose of the open() and close() system calls in file operations.

(ii) Consider a system which has main memory access time of 35ns and page fault service time of 175ns and page hit ratio is 75%. What will be the effective memory access time? (4+3)

(b) (i) What is file system? Explain various file operations in file system?

- (ii) Briefly, explain single-level, multi-level, and acyclic graph directories? (5+3)

(6)

5. (a) Explain the terms :

(i) Swapping

(ii) Virtual memory

(iii) Page fault

(b) (i) Explain the Single threaded and multithreaded process. What are the advantages of Threads in Operating Systems?

(ii) What are the major entries to evaluate the performance of CPU scheduling algorithms? (6+3)

(15)

7. Differentiate between following :

(i) Paging and segmentation

(ii) Dispatcher and scheduler

- (iii) Preemptive and Non-preemptive scheduling
- (iv) Multiprogramming and multitasking.
- (v) Internal fragmentation and External fragmentation