Total Pages : 8

AB-235547

M.Sc. (Semester-II) Examination, June-2025

(Backlog)

COMPUTER SCIENCE

(Operating System Concepts)

Time Allowed : Three Hours

Maximum Marks : 70

Note : This question paper is divided into **four** sections. Attempt questions of **all four** sections as per given direction. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note: Attempt **any ten** questions. Each question carries **1** mark. [10×1=10]

1. (A) Fill in the blanks:

(i) The kernel keeps track of the state of each task by using a data structure called.....

(ii) In Unix.....system call creates the new process.

(iii) A binary semaphore has the values.....

(iv) FCFS is.....scheduling algorithm.

(v) The purpose of a .....is to map logical addresses to physical addresses in virtual memory management.

(B) Multiple choice questions :

(vi) To access the services of operating system, the interface is provided by the:

(a) API

(b) Library

(c) System calls

(d) None of the above

(vii) A thread is a .....process.

(a) Heavy weight

(b) Light weight

(c) Inter thread

(d) Multiprocess

(viii) A major problem with priority scheduling is:

(a) Starvation

(b) Definite blocking

(c) Low priority

(d) None of the above

(ix) The content of the matrix need is :

(a) Allocation - Available

(b) Max-Available

(c) Max-Allocation

(d) Allocation-Max

(x) Contiguous memory allocation faces the problem of :

(a) Page Faults

(b) Less Hit Ratio

(c) Memory Fragmentation

(d) None of the above

(xi) Access matrix model for user authentication contains:

(a) a list of objects

(b) a list of domains

(c) a function which returns an objects type

(d) all of the mentioned

(xii) The open file table has a/an .....associated with each file.

(a) File content

(b) File permission

(c) Open count

(d) Close count

SECTION-B

(Very Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **2** marks. (Word limit 25-30 words) [5×2=10]

2. (i) What is Real Time OS?

(ii) What is Schedulers?

(iii) What is Critical Section Problem?

(iv) What is Page Fault?

(v) What are File Attributes?

(vi) Define Fragmentation.

(vii) What is Access Matrix?

SECTION-C

(Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **4** marks. (Word limit : 250 words) [5×4=20]

3. (i) Explain any four types of Operating System.

(ii) Explain process states with suitable diagram.

(iii) What are the necessary conditions for deadlock to occur?

(iv) For the page reference string :

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

Calculate the page fault applying optimal page replacement algorithms for a memory with three frames.

(v) What is the difference between Preemptive and Non-preemptive scheduling?

(vi) Explain the Producer-Consumer Problem of synchronization.

(vii) Explain the concept of protection and security in Operating System.

SECTION-D

(Long Answer Type Questions)

Note : Attempt **any three** questions. Each question carries **10** marks. (Word limit : 500 words) [3×10=30]

4. (i) Explain different functions and services of operating system in detail.

(ii) Consider the following set of processes with the length of the CPU burst given milliseconds. The processes are assumed to have arrived in the order P_1, P_2, P_3,P_4, P_5 all at time 0.

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

For each of the following algorithm determine- (a) Average Waiting Time and (b) Average Turn Around time. FCFS, SJF , non-preemptive priority (a smaller priority number implies a higher priority) and Round Robin (quantum = 1).

(iii) Write notes on the following :

(a) Segmentation

(b) Demand Paging

(c) Thrashing

(iv) Explain various Disk Scheduling Algorithm in Operating System with suitable diagram and example.

(v) Write note on the following :

(a) Goals and principles of protection

(b) Access Matrix and its implementation

(c) User Authentication

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