Roll Number: _____   Name of student: _____

NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR

Department of Computer Science and Engineering

(Spring Sem) End Semester Examination, May, 2022

M.C.A.: II Semester

Date of Exam: 11/05/2022
M. Marks: 50

Course Code: CA3204
Course Name: Operating System
Time: 3 Hours,
Name of Faculty: Dr. Mudassir Rafi

Note: *Attempt any 5 questions. Each question carries ten marks.*

Question 1: (a) What do you mean by Kernel of an Operating System? Describe the Interrupt handling mechanism in Operating System.

(5 marks)

(b) Describe DMA (Direct Memory Access) in OS. Write a short note on the storage device hierarchy.

(5 marks)

Question 2: (a) What is a process? Describe all the states of a process.

(5 marks)

(b) How a thread is different from process. What are P threads?

(5 marks)

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

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

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0.

I. Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non-preemptive priority (a smaller priority number implies a higher priority) and a RR scheduling(quantum=1).

II. Compute the waiting time of each process for each of the scheduling algorithms.

(8 marks)

b) Define Multi level Feedback queue scheduling.

(2 marks)

END-SEM 2022

Question 4:(a) Explain Segmentation. How it is different from paging?

(3 marks)

(b) Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order). How would each of the first fit, best fit, and worst fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Identify which algorithm makes the most efficient use of memory.

(7 marks)

Question 5: 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

How many page faults would occur for the following page replacement algorithms?

- LRU replacement
- FIFO replacement
- Optimal replacement

Assuming three, and five frames? Also compute Hit and Miss ratio for each case. Remember that all frames are initially empty.

(10 marks)

Question 6: (a) Differentiate between Short term and Long term schedulers. What is dispatch latency.

(5 marks)

(b) Describe Scheduling criteria in OS scheduling. How a Round robin Scheduling is different from priority scheduling?

(5 marks)

Question 7: (a) Explain Belady's Anomaly. How will you solve it?

(5 marks)

(b) Describe different types of Binding schemes: (a) Compile Time (b) Load Time and (c) Execution Time

(5 marks)

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