2023

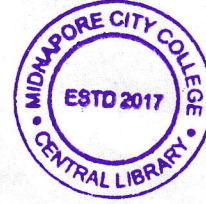## BCA 4th Semester Examination

Operating System

PAPER — 2202

Full Marks : 100

Time : 3 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Question No. **1** and *any* **four** from the rest.

1. Answer *any* **five** questions :   5×2=10

   (a) What is the main role of operating system?

   (b) Name two commercially available operating systems and their manufacturing company.

   (c) Define a process.

   (d) What do you mean by turnaround time of a process?

(e) What do you mean by CPU utilization rate?

(f) What is system call? Give example.

(g) What is a thread?

(h) What is aging?

2. Write about simple batch systems and timeshared operating system. Differentiate between multiprogramming and multitasking. Explain the various steps involved in the life cycle of a process using a transition diagram. 4+5+6=15

3. What are the various scheduling criteria? Explain their roles in evaluating scheduling algorithms. Consider the set of 6 processes whose arrival time and burst time are given below—Process Id, Arrival time, Burst time.

PROCESS ID	ARRIVAL TIME	BURST TIME
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

If the CPU scheduling policy is Round Robin with time quantum = 3, calculate the average waiting time, average turnaround time and throughput of the system. 2+4+9=15

4. Describe the following system calls : (i) fork, (ii) wait, (iii) waitpid and (iv) exec. Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created? 8+3+2+2=15

5. Explain contiguous and non-contiguous memory allocation with diagram. Consider the following page reference string : 7,2,3,1,2,5,3,4,6,7,1,0. Assume demand paging with four frames. Calculate the hit ratio for, (i) LRU, (ii) FIFO and (iii) optimal replacement algorithm. 6+9=15

6. Answer the following questions :

(a) Describe Process Control Block (PCB).

(b) Write the difference between spooling and buffering.

(c) What do you mean by fragmentation?

(d) Given six partitions of size 12k, 24k, 16k, 17k, 15k, 19k. If the job queue contains 15k, 11k, 18k, 14k, 19k, 13k, find the fragmentation area when the jobs are allocated using the best-fit policy. 3+4+2+6=15
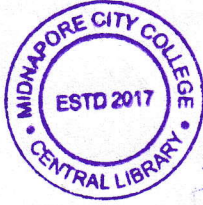
7. Answer the following questions :

(a) What is semaphore?

(b) Write the difference between thread and process.

(c) Explain the necessary conditions for solution to the critical section.

(d) What is thrashing?   3+3+6+3=15

[Internal Assessment : 30 Marks]

★ ★ ★