

Professional Course Examination, November/December 2019

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course : BCA-303

(Operating Systems)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(Marks : 25)

*The figures in the margin indicate full marks for the questions***SECTION—A**

(Marks : 15)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. In a time-sharing operating system, when the time slot given to a process is completed, the process goes from the running state to the
 - (a) ready state ()
 - (b) blocked state ()
 - (c) terminated state ()
 - (d) suspended state ()

2. Which of the following is an example of a spooled device?
 - (a) The secondary memory device in a virtual memory system ()
 - (b) A line printer used to print the output of a number of jobs ()
 - (c) The terminal used to enter the input data for a program being executed ()
 - (d) The primary memory device ()

3. The primary distinction between the short-term scheduler and the long-term scheduler is
- (a) the length of their queues ()
 - (b) the type of processes they schedule ()
 - (c) the frequency of their execution ()
 - (d) the time of execution ()
4. Termination of the process terminates
- (a) first thread of the process ()
 - (b) first two threads of the process ()
 - (c) all threads within the process ()
 - (d) no thread within the process ()
5. Time quantum is defined in
- (a) shortest job scheduling algorithm ()
 - (b) round robin scheduling algorithm ()
 - (c) priority scheduling algorithm ()
 - (d) None of the above ()
6. Memory management technique in which system stores and retrieves data from secondary storage for use in main memory is called
- (a) fragmentation ()
 - (b) paging ()
 - (c) mapping ()
 - (d) None of the above ()
7. Which algorithm chooses the page that has not been used for the longest period of time whenever the page required to be replaced?
- (a) First in first out algorithm ()
 - (b) Additional reference bit algorithm ()
 - (c) Least recently used algorithm ()
 - (d) None of the above ()
8. What is the name of the operating system that reads and reacts in terms of actual time?
- (a) Batch system ()
 - (b) Real-time system ()
 - (c) Time-sharing system ()
 - (d) None of the above ()

9. Which one of the following is a visual way to determine the deadlock occurrence?
- (a) Resource allocation graph () (b) Starvation graph ()
 (c) Inversion graph () (d) None of the above ()
10. The disadvantage of a process being allocated all its resources before beginning its execution is
- (a) low CPU utilization ()
 (b) very high-resource utilization ()
 (c) low-resource utilization ()
 (d) None of the above ()

Indicate whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. The systems which allow only one process execution at a time, are called uniprogramming systems. (T / F)
2. The time required to create a new thread in an existing process is greater than the time required to create a new process. (T / F)
3. Swap space exists in secondary memory. (T / F)
4. Time is used productively with multiprogramming. (T / F)
5. Trojan Horse is a useful way to encrypt password. (T / F)

SECTION—B		
(Marks : 10)		

Answer the following questions : 2×5=10

1. What are the advantages of distributed systems?
2. What are interrupt and context switching?
3. Define scheduling and scheduler.

4. Name any two operations performed in a file.
5. What are the differences between static and dynamic memory allocation?

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. (a) What is an operating system? What is the need for an operating system? Discuss the major functions of an operating system with examples. 2+2+6=10

OR

- (b) Describe the different types/classifications of operating systems. 6
- (c) What are the major services provided by OS? 4
2. (a) Name the different states of a process. With a neat block diagram, explain Process Control Block (PCB). 2+4=6
- (b) What are long-term and medium-term schedulers? 4

OR

- (c) What is meant by message passing and shared memory model for inter-process communication? Explain. 4
- (d) Consider the following set of processes :

Process Name	Arrival Time	Processing Time
P1	0	3
P2	1	5
P3	3	2
P4	9	6
P5	12	4

- (i) Draw four Gantt charts that illustrate the execution of these processes using FCFS, SJF, non-preemptive priority and round robin (quantum=1) scheduling algorithms.
- (ii) What is the turnaround time of each process for the above scheduling algorithms? 6

3. (a) What is virtual memory? Explain the concepts of swapping. 4
- (b) Consider the reference string : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. Calculate the number of page fault occurrences using FIFO, LRU and optimal page replacement algorithms assuming three page frames. 6

OR

- (c) Discuss partition allocation memory management technique with suitable diagrams. 6
- (d) Write a short note on process creation. 4
4. (a) How are directory structures in file system organized? Briefly describe the three common directory structures used in operating systems. $2+3=5$
- (b) Describe the procedure of file protection using access control and authentication. 5

OR

- (c) Explain the three major methods of disk space allocation in file system implementation with the help of suitable diagrams. 7
- (d) What is a file attribute? Discuss the different file types. 3
5. (a) Describe the necessary conditions for deadlock occurrence in the system. 4
- (b) Explain resource-allocation graph algorithm and banker's algorithm. 6

OR

- (c) What are critical section and mutual exclusion? Explain three solutions for critical section problem. 5
- (d) What are semaphores? Write a short note on properties and characteristics of semaphore. 5
