



BRAINWARE UNIVERSITY

Course –BCA

Operating System (BCA302)

(Semester – 3)

Time allotted: 3 Hours

Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Questions)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) The operating system of a computer acts as an interface between user and
 - a. Hardware
 - b. Memory
 - c. Peripheral
 - d. Kernel
 - (ii) In Resource Allocation Graph (RAG), circle represents
 - a. Resources
 - b. Processes
 - c. Both a and b
 - d. None of these
 - (iii) If the number of frames is increased, the page fault rate will decrease. This is known as
 - a. Belady's anomaly
 - b. Working set theory
 - c. Thrashing
 - d. Demand paging
 - (iv) Hypervisor is also called :
 - a. Virtual machine
 - b. Virtual Machine Monitor
 - c. Operating system
 - d. Host
 - (v) The process is :
 - a. A program only
 - b. A processor state
 - c. An instance of a program in execution
 - d. None of above
 - (vi) FCFS scheduling is :
 - a. Preemptive
 - b. Non preemptive
 - c. Deadline scheduling
 - d. None of these

- (vii) The indefinite blocking of low priority processes by a high priority processes is known as
- | | |
|---------------|-----------------|
| a. Starvation | b. Deadlock |
| c. Aging | d. All of these |
- (viii) Banker's algorithm is used for
- | | |
|-----------------------|-----------------------|
| a. Deadlock detection | b. Deadlock avoidance |
| c. Deadlock recovery | d. None of these |
- (ix) A section of code in which process may change shared variables is known as
- | | |
|---------------------|------------------|
| a. Atom | b. Procedure |
| c. Critical section | d. None of these |
- (x) V system is the example of
- | | |
|---------------------------------|-----------------------------|
| a. Distributed operating system | b. Network operating system |
| c. Embedded system | d. Real time system |

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

- | | |
|--|-------------|
| 2. Briefly discuss about process life cycle with suitable block diagram. | [5] |
| 3. Describe the utility of long term scheduler and short term scheduler. | [2.5 + 2.5] |
| 4. Define various causes of thrashing? | [5] |
| 5. What do you mean by throughput? Write down advantages and disadvantages of round robin scheduling policy. | [1 + 4] |
| 6. Describe any two functions of operating system. | [5] |

Group – C

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

7. (a) Consider a system with following information. Determine whether the system is in safe state.

Process	MAX			ALLOCATION		
	R ₁	R ₂	R ₃	R ₁	R ₂	R ₃
P ₁	5	6	3	2	1	0
P ₂	8	5	6	3	2	3
P ₃	4	9	2	3	0	2
P ₄	7	4	3	3	2	0
P ₅	4	3	3	1	0	1

[5]

- (b) If a request from process P₄ arrives at (2, 0, 2), can the request be granted immediately?

Total Resources

R ₁	R ₂	R ₃
15	8	8

[5]

- (c) Briefly discuss about the necessary condition for deadlock. [5]

8. (a) Consider the following page reference string:

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

How many page faults would occur for the following replacement algorithms, for a quota of 4 page frames? Assume that all frames are initially empty.

i) FIFO

ii) LRU

[3 + 3]

- (b) What are the differences between paging and segmentation? [5]

- (c) Briefly discuss about logical address space and physical address space with suitable block diagram. [4]

9. (a) Calculate the average turnaround time and average waiting time from the following table. (Apply SJF policy)

Process	Burst time (Millisecond)
P ₁	5
P ₂	24
P ₃	16
P ₄	10
P ₅	3

[5]

[5]

- (b) Write the difference between preemptive and non-preemptive scheduling policy.
- (c) Briefly discuss about starvation and ageing. [2.5 + 2.5]
10. (a) Discuss the various conditions of critical section. [5]
- (b) What is file? What are the main operations that a user can perform on a file? [1 + 3]
- (c) Explain about free space management of file system. [6]
11. Write short notes on any three of the following. [3 x 5]
- (a) Resource allocation graph
- (b) Producer consumer problem
- (c) Indexed sequential file
- (d) Virtual memory
- (e) Priority Scheduling