



22521/E 210

Reg. No.

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V Semester B.C.A.2 Degree Examination, November 2015

**OPERATING SYSTEM
(RCU - Regular/Repeaters)**

Time : 3 Hours]

[Max. Marks : 80

Instruction : Draw the diagrams wherever necessary.

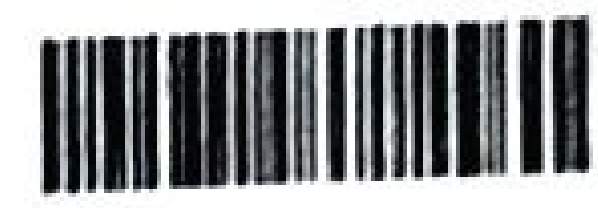
Simple calculators are permitted.

SECTION A

Answer any **ten** questions :

(10 × 2 = 20)

1. What is a system call? Mention different types of system call.
2. Define preemptive and non-preemptive CPU scheduling.
3. Define a thread. State the major advantage of thread.
4. Give the necessary conditions for deadlock to occur.
5. Define context switch.
6. What are the disadvantages of contiguous memory allocation?
7. What is a page fault?
8. What is internal fragmentation?
9. List the different file attributes.
10. Define the term backup and recovery.
11. What is a onetime password?
12. Mention different biometric devices for user authentication.



SECTION B

Answer any **six** questions :

(6 × 5 = 30)

13. Explain function of OS in resource allocation and scheduling.
14. What are the components of process control block? Explain.
15. Show how to implement mutual exclusion in multiprocessing environment through SetAndTest() instruction.
16. Explain dining philosopher's problem of synchronization.
17. Explain in detail segmentation with respect to memory management.
18. Explain linked list method of free space management.
19. Discuss the commonly used operations on file.
20. Explain boot blocks with respect to disk management.

SECTION C

Answer any **three** questions :

(3 × 10 = 30)

21. Assume the following processes arrive for execution at the time indicated and also the length of CPU-burst time and arrival time is given in milliseconds.

Process	Burst time (ms)	Priority	Arrival time (ms)
P_1	8	4	0
P_2	9	1	0
P_3	4	2	1
P_4	3	3	2

- (a) Give a Gantt chart illustrating the execution of these processes using SJF (preemptive) and priority (non preemptive), lower number indicates high priority. (4)
- (b) Calculate the average waiting time for each of the above scheduling algorithm. (6)



22. Consider the following system snapshot using data structures in the Banker's algorithm, with resources A , B , C and D and processes P_0 to P_4 .

Allocation					Max					Available				
	A	B	C	D		A	B	C	D	A	B	C	D	
P_0	4	0	0	1	P_0	6	0	1	2	3	2	1	1	
P_1	1	1	0	0	P_1	1	7	5	0					
P_2	1	2	5	4	P_2	2	3	5	6					
P_3	0	6	3	3	P_3	1	6	5	3					
P_4	0	2	1	2	P_4	1	6	5	6					

Using Banker's algorithm, answer the following questions :

- (a) How many resources of type A , B , C and D are there? (2)
- (b) What are the contents of need matrix? (2)
- (c) Is the system in a safe state? Why? (3)
- (d) If a request from process P_4 arrives for additional resources of $(1, 2, 0, 0)$, can the request be granted immediately? (3)
23. 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.
- Calculate the number of page fault that will occur for the following page replacement algorithm, assuming 3 frames.
- Initially all the frames are empty.
- (a) LRU replacement. (5)
- (b) Optimal replacement. (5)
24. (a) What is Consistency semantics? (5)
- (b) Briefly explain the layered structure of file system. (5)
25. (a) Define authentication. (2)
- (b) A hard disk having 100 cylinders, numbered from 0 to 99. The drive is currently serving the request at cylinder 43. The status of the queue is as follows : 68, 90, 47, 15, 67, 58, 56, 50, 10, 75, 99. What is the total number of head movements to satisfy all the pending requests for each of the following disk-scheduling algorithms?
- (i) FCFS (4)
- (ii) SSTF (4)