

END TERM EXAMINATION

FIFTH SEMESTER [BCA] JANUARY-FEBRUARY 2023

Paper Code: BCA301

Subject: Operating System

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q.No.1 which is compulsory. Select one question from each unit.

- Q1. Answer the following (Do **any ten** parts): (2.5x10=25)
- a) Explain context switching. How can context switching time be reduced?
 - b) What is Throughput, Turnaround time, waiting time and Response time?
 - c) What are the tradeoffs in handheld systems?
 - d) Explain multithreading models.
 - e) Why do we say that the operating is a resource manager?
 - f) What is an address space? Differentiate between memory address space and I/O address space.
 - g) What is a lightweight process, and why is it called so?
 - h) What is the difference between *starvation* and *deadlock*? Does one necessarily imply the other?
 - i) Differentiate between SCAN and C-SCAN disk scheduling algorithm.
 - j) What is the need of virtual memory?
 - k) What is the principle of page replacement policy?
 - l) Explain general model of file system.
 - m) What are the contents of Process Control Block?

UNIT-I

- Q2 i) Define the properties of the following operating systems. (8)
- a) Batch
 - b) Time sharing
 - c) Real time systems
 - d) Parallel systems
- ii) What is the difference between paging and Segmentation? (4.5)
- Q3 Consider the following reference string: (12.5)
- 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
- How many page faults will occur for a. FIFO b. LRU and c. OPT page replacement algorithms?
- Assuming four and five frames. (All frames are initially empty).

UNIT-II

- Q4 Consider the following set of processes, with their CPU-burst time and arrival time given in milliseconds: (12.5)

Process	Arrival Time	Burst Time	Priority
P1	0	4	4
P2	3	6	2
P3	5	5	1
P4	8	6	3

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- a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SRTN, RR (Time Slice=2) and preemptive priority scheduling.
- b) What is the turnaround and waiting time of each process for each of the scheduling algorithms in part (a)?
- c) Which of the schedules in part (a) results in the minimal average waiting time?
- Q5 a) Explain producer consumer problem with the help of algorithm. **(6.5)**
- b) Give a monitor based solution for dining philosopher's problem. **(6)**

UNIT-III

- Q6 i) Distinguish between: **(6)**
- a) Multiplexing and buffering
- b) Channels and Control Units
- c) Dedicated and Shared Devices
- ii) What is the way to recover from deadlock? **(6.5)**
- Q7 Consider the following current resource allocation state: **(12.5)**

Process	Allocation			Max			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	7	7	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

- i) Is the current allocation state safe?
- ii) Would the following requests be granted in the current state?
- Process P1 requests (1, 1, 0)

UNIT-IV

- Q8 a) Explain directory structures in detail. **(6)**
- b) Differentiate between contiguous and linked allocation methods of a file. **(6.5)**
- Q9 a) What is the use of Access matrix in protection? **(4)**
- b) Explain different threats on systems in detail. **(8.5)**
