(Please write your Exam Roll No.) *Exam Roll No.* .....(14).....

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)**

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