GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fourth Semester Regular) Examinations, May – 2024

22BCSPC24003 – Operating Systems

(CSE,CSE(AIML),CSE(DS))

Time: 3 hrs   Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

PART – A   **(2 x 5 = 10 Marks)**

Q.1. Answer **ALL** questions

		CO #	Blooms Level
a.	What is meant by CPU-bound process?	CO2	K1
b.	What is the Difference between a Program and a Process?	CO2	K1
c.	Which algorithm leads convoy effect? Explain the convoy effect.	CO4	K1
d.	What is starvation? Why does it occur?	CO2	K1
e.	Define busy waiting and spinlock.	CO3	K1

PART – B   **(15 x 4=60 Marks)**

Answer **ALL** questions

		Marks	CO #	Blooms Level
2. a.	Explain the various types of Operating Systems.	7	CO2	K2
b.	Consider 4 processes P1, P2, P3 and P4, which require 5, 7,2 and 4 time units and arrive at time 0, 1 3, and 4. Draw the Gant chart, process completion sequence and average waiting time for. (i) Round robin scheduling with CPU quantum of 2 time units. (ii) FCFS.	8	CO2	K3

(OR)

		Marks	CO #	Blooms Level
c.	Explain briefly System calls with an example.	7	CO1	K2
d.	What is Semaphore? Explain producer consumer problem using semaphore.	8	CO2	K1
3.a.	Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compare the number of page faults for LRU and Optimal page replacement algorithm.	7	CO3	K3
b.	Explain multi-level queue and multi-level feedback queue scheduling with suitable examples	8	CO2	K2

(OR)

		Marks	CO #	Blooms Level
c.	Compute the average waiting time for the processes using pre-emptive SJF scheduling algorithm and FCFS algorithm.	7	CO2	K3

Process	Arrival time	Burst time
P1	0	7
P2	2	4
P3	4	1
P4	5	4
P5	3	4

		Marks	CO #	Blooms Level
d.	Explain the difference between external and internal fragmentation with an example.	8	CO3	K2
4.a.	Free memory holes of sizes 15K, 10K, 5K, 25K, 30K, 40K are available. The processes of size 12K, 2K, 25K, 20K is to be allocated. How processes are placed in first fit, best fit, worst fit. Calculate internal as well as external	7	CO3	K3

fragmentation.

b.	Explain the following: (i) Demand paging (ii) Thrashing	8	CO3	K2

(OR)

c.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P₀	0	0	1	2	0	0	1	2	1	5	2	0
P₁	1	0	0	0	1	7	5	0				
P₂	1	3	5	4	2	3	5	6				
P₃	0	6	3	2	0	6	5	2				
P₄	0	0	1	4	0	6	5	6				

7   CO3   K3

With reference to Bankers algorithm
i) What is the content of need matrix?
ii) Is the system in a safe state?

d.	Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems?	8	CO2	K2
5.a.	Describe the SSTF, C-SACAN, LOOK disk scheduling algorithm using the following data. The dist head is initially at position-cylinder 53.the cylinder sequence of requests is 98, 183, 37, 122, 14, 124, 65, and 67. find the total head movement	8	CO4	K3
b.	Differentiate between internal and external fragmentation.	7	CO3	K2

(OR)

c.	The following processes are being scheduled using a preemptive, round robin scheduling algorithm:	8	CO2	K3

Process	Priority	Burst	Arrival
P_1	40	20	0
P_2	30	25	25
P_3	30	25	30
P_4	35	15	60
P_5	5	10	100
P_6	10	10	105

Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. In addition to the processes listed above, the system also has an idle task (which consumes no CPU resources and is indented as P_{idle}). This task has priority 0 and is scheduled whenever the system has no other available processes to run. The length of a time quantum is 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.
(i) Show the scheduling order of the processes using a Gantt chart.
(ii) What is the turnaround time for each process?
(iii) What is the waiting time for each process?
(iv) What is the CPU utilization rate?

d.	Write a note on file types and file structures	7	CO4	K1

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