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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S, FE) / S4 (PT) (S, FE) Examination January 2024 (2015 Scheme)

Course Code: CS204

Course Name: OPERATING SYSTEMS (CS)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each carries 3 marks.

1		Explain the role of timer in operating system?	3
2		Explain monolithic structure of an operating system	3
3		Discuss the different states of a process.	3
4		Explain PCB? Where is it used? What are its contents?	3

PART B

Answer any two questions. Each carries 9 marks.

5	a)	Explain any two Kernel data structures with suitable example.	5
	b)	Briefly discuss pipes for message passing.	4
6	a)	Differentiate between long term, short term and medium-term schedulers.	6
	b)	Explain System Boot Process	3
7	a)	Differentiate between monolithic and microkernel design of OS	4
	b)	Explain the dual mode operation of OS	5

PART C

Answer all questions. Each carries 3 marks.

8		Differentiate between counting semaphore and binary semaphore	3
9		Explain the three requirements to critical section problem.	3
10		Explain resource allocation graph with an example.	3
11		Explain starvation in OS. How starvation can be solved?	3

PART D

Answer any two questions. Each carries 9 marks.

12	a	Solve dining philosophers' problem using monitors.	5
	b	Explain the conditions that lead to deadlock	4

13 a) Draw the Gantt chart and find Average waiting time and Average Turnaround time for the following algorithms using the data given in the table: 5

i) FCFS ii) SJF

Process	Burst Time
P1	5
P2	24
P3	16
P4	10
P5	3

b) Explain the strategies to recover from deadlock 4

14 Consider the following snapshot of a system with five process P0, P1, P2, P3 P4 and four resources A, B, C, D 9

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

Using Banker's algorithm, answer the following questions: -

i) How many resources of type A, B, C, D are there?

ii) What are the contents of need matrix?

iii) Find if the system is in safe state? If it is, find the safe sequence.

PART E

Answer any four questions. Each carries 10 marks.

15 a) With a neat diagram, explain paging 6

b) Explain swapping with the help of a diagram 4

16 a) Differentiate internal and external fragmentation 6

b) Explain thrashing 4

17 Explain FCFS, SSTF disk scheduling algorithms using the given disk queue requests 87, 160, 40, 140, 36, 72, 66, 15. Assume that the disk has 200 platters ranging from 0 to 199 and the current position of head is at cylinder 60. 10

18	a)	Explain disk formatting	5
	b)	Differentiate sequential access and direct access methods	5
19	a)	Explain File attributes	4
	b)	Explain any two file allocation methods	6
20	a)	Explain the use of access matrix in protection	6
	b)	Explain i) Seek Time ii) Rotational latency	4