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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 50028

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Fifth Semester

Electrical and Electronics Engineering
U23CSOE1 – FUNDAMENTALS OF OS

(Common to ECE & BME)

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Give two examples of device management system call.	2	K1	CO1
2.	State the name of the structure that matches with that of the Android OS.	2	K1	CO1
3.	Specify two differences between a process and a thread.	2	K1	CO2
4.	Define a binary semaphore.	2	K1	CO2
5.	Provide two problems associated with paging.	2	K2	CO3
6.	Mention two merits of continuous memory allocation.	2	K2	CO3
7.	Explain two different reasons on the need of disk scheduling in a modern operating system.	2	K2	CO4
8.	Mention two methods of free space management.	2	K1	CO4
9.	State two differences between virtualization and cloud computing?	2	K2	CO5
10.	Out of iOS and Android, which one is more secure? Why?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11.	a) Specify the structure of an OS with block diagram. Briefly explain the functions of each block.	13	K2	CO1
	(OR)			
	b) Discuss the core services provided by a modern operating system.	13	K2	CO1
12.	a) Define the Critical Section problem. How the problem is solved in a two process system?	13	K3	CO2
	(OR)			
	b) Mention the necessary conditions of deadlock. What are the differences between deadlock prevention and deadlock avoidance?	13	K4	CO2
13.	a) Explain the structure of a page table. Elaborate one serious problem with paging.	13	K3	CO3
	(OR)			
	b) Given page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm when 4 frames are available.	13	K3	CO3
14.	a) Discuss the “Elevator” algorithm for disk scheduling with an example.	13	K2	CO4
	(OR)			
	b) Compare tree based and graph based directory structure.	13	K2	CO4
15.	a) State the differences between a Type 1 and a Type 2 hypervisor in the context of virtualization.	13	K3	CO5
	(OR)			
	b) Compare five differences between Android and iOS.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

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|--------|---|-------|----|-----|
| Q.No. | Questions | Marks | KL | CO |
| 16. a) | Considering a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t0 following snapshot of the system has been taken: | 15 | K4 | CO2 |

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Check and confirm whether the system is in a safe state.

(OR)

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|----|---|----|----|-----|
| b) | Consider the following processes with CPU execution time. | 15 | K3 | CO3 |
| | <ul style="list-style-type: none"> • Draw the Gantt chart for FCFS scheduling. • Calculate the waiting time and turnaround time for each process. • Find the average waiting time and average turnaround time. • Briefly explain the FCFS scheduling algorithm. | | | |

Process id	Arrival time	Burst time/CPU execution time
P1	0	2
P2	1	3
P3	2	5
P4	3	4
P5	4	6