Code No. : 14265 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade
B.E. IV-Semester Main & Backlog Examinations, July-2023
Operating Systems
(Common to CSE & AIML)

Time: **3 hours**

Max. Marks: **60**

Note: *Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What is Operating system? Draw an abstract view of the components of computer system?	2	1	1	1
2.	How many times following code will print Hello-1? `#include <stdio.h>` `#include <sys/types.h>` `int main()` `{` `if (fork() && fork())` `fork();` `printf ("Hello-1\n");` `return 0;` `}`	2	2	1	2
3.	What is starvation? Which scheduling algorithm results in starvation?	2	1	2	1
4.	A 500KB memory is managed by using variable partitions but no compaction. It is currently having two processes of size 100KB and 160KB. What is the smallest allocation request in KB that could be denied?	2	2	2	2
5.	What is semaphore? At a particular time of computation, the value of a counting semaphore is 7. Then 20 P operations and 15 V operations were completed on this semaphore. Find the resulting value of the semaphore?	2	2	3	2
6.	What is deadlock? Differentiate between deadlock avoidance and deadlock detection methods to handle deadlock?	2	1	3	1
7.	What is a file? List out the fields in File control Block (FCB)?	2	1	4	1
8.	What is RAID? Differentiate RAID levels (0+1) and (1+0) levels with neat block diagram.	2	2	4	2
9.	List out the components of Windows operating system?	2	1	5	1
10.	List out seven activity life cycle methods with flowchart of Android Activity life cycle?	2	1	5	1

Part-B (5 × 8 = 40 Marks)

11. a)	List and explain the operating systems services / functions that are helpful to (i) the users and (ii) systems itself.	4	2	1	2
b)	Suppose that a process spends a fraction P of its time in I/O wait state. With N processes in memory at once, determine (i) the probability that all n processes are waiting for I/O, (ii) the probability that all processes are not waiting for I/O, (iii) the probability that at least one process not waiting for I/O, and (iv) CPU Utilization? With 4 processes in memory and 80% average I/O wait, find CPU utilization??	4	3	1	3
12. a)	What is page fault? Explain the procedural steps for page-fault with neat block diagram?	4	2	2	2
b)	Give Gantt chart and calculate Avg. Turn-around Time and Waiting Time for the following set of processes using (i) Shortest Job First with Non-Pre-emptive and (ii) Pre-emptive priority scheduling. (Assume higher the integer value higher the priority)	4	3	2	2

Process	Arrival time (in ms)	CPU Burst Time (in ms)	Priority
P1	0	15	2
P2	2	3	1
P3	5	5	5
P4	6	8	4
P5	7	12	3

13. a)	What is a monitor? Explain its structure and how dining philosopher's problems has been solved using monitor?	4	3	3	2
b)	Consider a system with five processes <P1, P2, P3, P4, P5> and three resource types <R1, R2, R3> and at time T=0, the following snapshot of the system has been taken.	4	3	3	3

	Allocated			Maximum			Available		
Process	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	2			
P4	0	2	0	7	5	3			
P5	1	1	2	11	2	3			

i) Determine current state is safe or un-safe using Bankers' algorithm.

ii) Would the following request <3, 3, 1> by P1 be granted in the current state?

14. a)	Explain following directory structures with neat diagram: (i) Single-Level Directory, (ii) Two-Level Directory, (iii) Hierarchical/Tree-Structured Directory, and (iv) Acyclic-Graph Directories.	4	2	4	2