

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 16118 (C)

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD****B.E. (CBCS) VI-Semester Main Examinations, January-2021****Introduction to Operating Systems**

(Open Elective-V)

Time: 2 hours

Max. Marks: 60

*Note: Answer any NINE questions from Part-A and any THREE from Part-B***Part-A (9 × 2 = 18 Marks)**

Q. No.	Stem of the question	M	L	CO	PO												
1.	Implement a Shell program to compute number of even and odd numbers till a given number 'n'	2	3	1	1,2,3												
2.	If you run the same program twice, which section would be shared in the memory?	2	2	1	1,2,3												
3.	Consider number of frames as 64 and page size= 4kb. Find the number of bits in physical address.	2	3	2	1,2,3												
4.	Distinguish between internal and external fragmentation?	2	2	2	1,2,3												
5.	Each file is represented with a set of attributes. Mention the name and significance of each attribute.	2	2	3	1,2,3												
6.	List any four common file types.	2	2	3	1,2,3												
7.	Construct a resource allocation graph for the instance given below no.of process=(P1,P2,P3), no.of resources=(R1,R2,R3,R4) An instance of R1, R2 is allocated to P1 and it is requesting for an instance of R4. P2 process is allocated an instance of R3 and requesting for an instance of R4. P3 process is requesting for an instance of R1 and R2.	2	3	4	1,2,3												
8.	State the requirements that a solution to the critical section problem must satisfy?	2	1	4	1,2,3												
9.	Draw a neat diagram to show the structure of a disk	2	2	5	1,2,3												
10.	What are Interrupts? Give two examples	2	1	5	1,2,3												
11.	Find the waiting time for the process P1 for the example given below using SJF method	2	3	1	1,2,3												
	<table border="1"> <thead> <tr> <th>Process</th> <th>Arrival time</th> <th>Burst time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>12</td> </tr> <tr> <td>P2</td> <td>0</td> <td>5</td> </tr> <tr> <td>P3</td> <td>1</td> <td>3</td> </tr> </tbody> </table>	Process	Arrival time	Burst time	P1	0	12	P2	0	5	P3	1	3				
Process	Arrival time	Burst time															
P1	0	12															
P2	0	5															
P3	1	3															
12.	Find the page number if the virtual address is 245 and page size is 32 bits.	2	3	2	1,2,3												

Contd... 2

**Part-B (3 × 14 = 42 Marks)**

13. a) Consider the process P1,P2,P3,P4 given below. Find the average waiting and Turn-around time by using FCFS and Priority scheduling algorithms. 8 3 1 1,2,3

Process	Process time	Burst time	Priority
P1	21	2	2
P2	3	1	1
P3	6	4	4
P4	2	3	3

- b) Explain the services of Operating System with a neat diagram 6 2 1 1,2,3
14. a) Describe how Logical address is converted to Physical address by using Paging. 6 2 2 1,2,3
- b) Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the following page replacement algorithms? 8 3 2 1,2,3  
 a) FIFO b) Optimal
15. a) Compare different file access methods. 6 2 3 1,2,3
- b) Explain the following Directory structures with neat sketches. 8 2 3 1,2,3  
 i) Single-Level  
 ii) Two-Level  
 iii) Tree-structured  
 iv) Graph acyclic
16. a) Describe the two methods for recovering from deadlocks. 4 2 4 1,2,3
- b) Consider system with five processor P0 to P4 and 3 resources A, B and C, Resources type A has 10 instances, B has 5 instances and C has 7 instances. The snapshot at time T0 is 10 3 4 1,2,3

	ALLOTTED			MAX		
	A	B	C	A	B	C
P0	0	1	0	7	5	3
P1	2	0	0	3	2	2
P2	3	0	2	9	0	2
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

Now the process P1 request one additional resource type A and two instances of C. Determine whether this new state is safe or not.

17. a)	Compute total Seek time for the I/O reference string given below by using FCFS, SSTF, SCAN and LOOK disk scheduling algorithms. I/O reference string: 43,26,95,34,119,11,123,76 Total no.of cylinders= 200 Current position of read/write head= 50, previous position= 67	10	2	5	1,2,3																				
b)	Explain interrupt-driven I/O implementation with a neat block diagram	4	2	4	1,2,3																				
18. a)	Find average waiting time and turn-around time by using Round robin CPU scheduling algorithm. Time quantum=3 msec	8	2	5	1,2,3																				
<table border="1"> <thead> <tr> <th>Process time</th> <th>Arrival time</th> <th>Burst time</th> <th>Priority</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>21</td> <td>2</td> </tr> <tr> <td>P2</td> <td>0</td> <td>3</td> <td>1</td> </tr> <tr> <td>P3</td> <td>4</td> <td>6</td> <td>4</td> </tr> <tr> <td>P4</td> <td>4</td> <td>2</td> <td>3</td> </tr> </tbody> </table>						Process time	Arrival time	Burst time	Priority	P1	0	21	2	P2	0	3	1	P3	4	6	4	P4	4	2	3
Process time	Arrival time	Burst time	Priority																						
P1	0	21	2																						
P2	0	3	1																						
P3	4	6	4																						
P4	4	2	3																						
b)	Explain different file allocation methods with neat diagrams	6	2	5	1,2,3																				
19.	Answer any <i>two</i> of the following:																								
a)	Explain the role of File system interface in read/write operations	7	2	3	1,2,3																				
b)	Define deadlock? List the four conditions necessary for a deadlock situation to arise? How it can be prevented?	7	2	4	1,2,3																				
c)	Many computers avoid burdening the main CPU with PIO by offloading some of this work to a special-purpose processor called a direct-memory-access (DMA) controller. Justify your answer	7	3	5	1,2,3																				

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60%
2	Knowledge on application and analysis (Level-3 & 4)	40%
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	--

\*\*\*\*\*