1. Mention the use of resource-allocation graph.
2. "If there is a cycle in the resource allocation graph, it may or may not be in deadlock state". Comment on this statement.
3. What is meant by 'starvation' in operating system?
4. Show what are the schemes used to handle deadlock.
5. Name any two differences between logical and physical addresses.
6. Differentiate paging and segmentation.
7. What is thrashing? and how to resolve this problem?
8. List out the drawbacks in indexed allocation.
9. In memory management consider the program named as Stack1 which size is 100 KB. This program is loaded in the main memory from 2100 to 2200KB. Show the contents of the page map table for the given scenario.
10. What is meant by address binding? Mention the different types.
11. Do FAT file system advantageous? Justify your answer?
12. In memory management consider the program named as Stack1 which sizeis 100 KB. This program is loaded in the main memory from 2100 to 2200KB. Show the contents of the page map table for the given scenario.
13. When is page replacement algorithm needed?
14. Will optimal page replacement algorithm suffer from Belady's anomaly?
15. Justify your answer.
16. State the effect of Thrashing in an operating system.
17. What is thrashing? and how to resolve this problem?
18. What is meant by address binding? Mention the different types.
19. Write about swapping. Let us assume the user process is of size 1MB and the backing store is a standard hard disk with a transfer rate of 5 MBPS. Calculate the transfer rate.
20. How does the swapping process occur?
21. Consider the following Segmentation table.

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

22. What are -the physical addresses for the logical addresses 3400 and 0110?
23. What do you mean by compaction? In which situation is it applied?
24. Consider the following page-reference string: 1,2,3,4,5,6,7,8,9,10,11,12.
25. How many page faults and page fault ratio would occur for the FIFO page replacement algorithm? Assuming there is four frames.
26. What is meant by pre-paging? Is it better than demand paging?
27. Define external fragmentation.
28. Define demand paging in memory management.
29. Mention the significance of LDT and GDT in segmentation.
30. Why are page sizes always powers of 2?
31. Give the steps required to handle a page fault in demand paging.
32. Show what do you meant by hit and miss in paging.
33. Analyse the common strategies to select a free hole from a set of available holes?
34. How the problem of internal fragmentation can be solved?

PART - B

1. Consider the following system snapshot using data structures in the Banker's algorithm with resources A,B,C and D and process P0 to P4:

	Max	Allocation	Available	Need
	A B C D	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	1 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 and D are there? (2)

(ii)What are the contents of the need matrix? (3)

(iii) Is the system in a safe state? Why? (3)

(iv) If a request from process P4 arrives for additional resources of (1,2,0,0) can the banker's algorithm grant the request immediately? Show the new system state and other criteria. (6)

2. Outline a solution to solve Bounded buffer, Readers and Writers problem and Dining philosopher problem.
3. Design how to implement wait( ) and signal( ) semaphore operations. Explain the same with suitable coding.
4. Explain main memory management in detail with necessary diagram. (13)
5. Discuss about contiguous memory allocation with a neat diagram. (13)Discuss situation
6. under which the FIFO page replacement algorithm generates fewer page faults than the LRU page replacement algorithm..(13)

7. (i)When do page faults occur? (3)

(ii)Consider the reference string:1,2,3,4,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.

How many page faults and page fault rate occur for the FIFO, LRU and optimal replacement algorithms, assuming three and four page frames? (10)

8. Given memory partitions of 500 KB, 100 KB, 300 KB, 200 KB and 600 KB in order, how would each of the first-fit, best-fit, and worst-fit algorithms place processes of size 418 KB, 202 KB, 506 KB,11 2 KB, and95 KB (in order)? Which the algorithms make the most efficient use of memory? (13)
9. Compare paging with segmentation in terms of the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses. (13)
10. i) What is the cause of Thrashing? (3)
    ii) How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? (10)
11. Draw the diagram of segmentation memory management scheme and explain its principle. (13)
12. I) Analyse how paging supports virtual memory. (4)
    ii) With neat diagram explain how logical memory addresses are translated into physical memory address. (9)

13. 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 replacement algorithms, assuming 1 and 3 free frames? Remember that all the frames are initially empty so that first unique page request will all cost one fault each.LRU replacement, FIFO, Optimal replacement. (13)
14. Discuss the given memory management techniques with diagrams.

(i)Paging and (7)

(ii) Translation Look-aside Buffer.(6)

15. I)Consider a computer system with 16 bit logical address and 4KB page size. The system support up

to 1 MB of physical memory. Assume that the actual address size is only 33KB,Page table base register contains 1000.and free frame list contains 13,11,9,7,5,3,1,2,4,6,8.

Construct physical and logical memory structures, page table of the corresponding process. Find the physical address of 13,256 and another logical address with page number 2 and offset of 128.

ii) Discuss about the possible valid-invalid bit and possible protection bits in page table. (8)

16. Consider a paging system with page table stored in memory
    a. If a memory reference takes 50ns how long does a paged memory referenced take?
    b. If we add TLB and 75% of all page table reference are found in TLB, what is the effective memory reference time?(Assume that find a page entry in TLB takes 2ns,if entry is present) (5)
17. Discuss the steps needed to handle page fault with neat illustration.(13)

Illustrate what are the various Page Replacement Algorithms used in memory management. (13)

18. Evaluate when page faults will occur? Describe the actions taken by operating system during page fault. (13)

PART – C

1) Consider the following page reference string: 1, 2, 3, 4, 5, 3,4,1,6,7,8,7, 8, 9, 7, 8, 9, 5, 4, 4, 5, 3 How many page faults would occur for the followingreplacement algorithms, assuming four frames? Remembering all frames are initially empty. (15)

i) LRU replacement

ii) FIFO replacement

iii) Optimal replacement.

2. i) Explain in detail about paging in 32-bit and 64-bit architectures (5)

ii) Consider a system that allocated pages of different sizes to its processes. What are the advantages of such a paging scheme? What are modifications to the virtual memory system provide this functionality? (10)

3. I) Consider the following page reference string: 1,2, 3, 2, 5, 6, 3, 4, 6, 3, 7, 3, 1, 5, 3, 6, 3, 4, 2, 4, 3, 4, 5, 1 Indicate page faults and calculate total number of page faults and successful ratio for FIFO, optimal and LRU algorithms. Assume there are four frames and initially all the frames are empty. (12)

   ii) Explain the effect of thrashing. (3)

4. Differentiate between internal and external fragmentation? Suppose that we have memory of 1000 KB with partitions of size 150 KB , 200 KB, 250 KB, 100 KB AND 300 KB. Where the processes A and B of size 175 KB and 125 KB will be loaded, if we used Best fit and Worst fit? (15)

5. Most systems allow programs to allocate more memory to its address space during execution. Data allocated in the heap segments of programs is an example of such allocated memory. What is required to support dynamic memory allocation in the following schemes? (15)