d) Consider the following page reference string:
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.
Find the number of page faults using following page replacement algorithms using frame size of 3:
i) LRU   ii) FIFO   iii) Optimal

OR

What is the cause of thrashing? How does the system detect thrashing? Once the thrashing is detected, what can the system do to handle thrashing?

Unit - V

5. a) Why directories are needed? Explain the basic operations performed on a directory?

b) Explain the concept of File? Enlist the attributes of a File?

c) What are the benefits of distributed file system, when compared to a file system in a centralized system?

d) Consider the system that supports strategies of contiguous linked and indexed allocation, what criteria should be used in deciding, which strategy is best utilized for a particular file?

OR

Suppose that head of moving head disk with 200 tracks numbered from 0 to 199 is currently serving a request at 50 tracks and has just finished a request at track 85. If the queue of request is kept in FIFO order.
100, 199, 56, 150, 25, 155, 70, 85.
A seek takes 6 msec per cylinder moved. How much seek time is needed for the following:
i) FCFS   ii) SSTF
iii) SCAN   iv) LOOK
v) C-LOCK

Roll No ....

IT - 504
B.E. V Semester
Examination, June 2015
System Programming and Operating System

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

UNIT – I

1. a) Differentiate between Linkers and Loader?

b) Explain Linking for overlays with example?

c) What do you mean by code optimization ? How it is achieved?

d) What is an operating System? Describe following operating system in detail.
i) Time Sharing System
ii) Real Time System

OR

Comment on the followings:
Self Relocating Programs are less efficient than re locatable programs.

UNIT – II

2. a) Define Semaphores? Show that if **wait** and **signal** operations are not executed atomically then mutual exclusion may be violated.

   b) Differentiate between User Level and Kernel Level threads? Under what circumstances is one type is better than other?

   c) Define the Process? Also explain the various fields of PCB.

   d) Describe inter process communication with the explanation of various classical problem of synchronization?

OR

Consider the following set of processes with the length of the CPU burst time given in milliseconds.

Process	Burst time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0, Draw the Gantt Chart of scheduling, Calculate Turn Around Time. Average Waiting Time of Each Process for the following Scheduling algorithms.

   i) FCFS
   ii) SJF
   iii) Round Robin (Time Quantum=1)
   iv) SRTF

UNIT – III

3. a) Explain the various necessary conditions for the Deadlock?

   b) What is logical address? Explain the need of logical address system in process execution?

   c) Given memory partition of 100KB, 500KB, 200KB, 300KB and 600KB (in order). How would each of the first fit, best fit and worst fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in Order)? Which algorithm makes the most efficient use of memory?

   d) Differentiate between paging and segmentation in detail and explain why are segmentation and paging sometimes combining in to one scheme. Justify?

OR

Consider the following snapshot of a system.

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using banker's algorithm.

   i) What is the content of matrix *Need?*
   ii) Is the system is Safe state?
   iii) If the request from process P_1 arrives for (*0, 4, 2, 0*) Can the request be granted immediately?

Unit – IV

4. a) Define Demand paging? Explain the role of lazy swapper in it?

   b) Describe the term of locality of reference with suitable example.

   c) Explain the term Belady's anomaly? In which page replacement algorithm and situation it occurs show by an example?

IT-504

PTO