S.Y.C.S Sem - III

D - (2)

H114100P0S

Duration :- (2½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.
5) Assume suitable data if required.

Q. 1 Attempt All (Each of 5 Marks) (15M)

(a) Multiple Choice Questions.

i. A page fault occurs
   a) when the page is not in the memory
   b) when the page is in the memory
   c) when the process enters the blocked state
   d) when the process is in the ready state.

ii. A major problem with priority scheduling is
   a) Definite blocking b) Starvation c) Low priority d) Deadlock

iii. The _____ time is the time for the disk arm to move the heads to the cylinder containing the desired sector.
   a) Latency b) response c) rotational d) seek

iv. When several processes access and manipulate the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, it is called _____.
   a) Linking b) Race condition c) synchronization d) process communication

v. _____ are necessary conditions to occur deadlock.
   i. Mutual Exclusion ii. Hold and Wait iii. No pre-emption iv. Circular Wait
   a) i, ii, iv b) ii, iii, iv c) i, ii d) i, ii, iii, iv

(b) Fill in the blanks and rewrite the sentence.
(Page number, microkernel, Hardware, C-SCAN, logical address, real time)

i. Operating system's _____ approach structures the operating system by removing all nonessential components from the kernel and implementing them as system and user level programs.
ii. In disk scheduling, _____ scheduling moves the head from one end of the disk to the other, servicing requests along the way.
iii. Every address generated by the CPU is divided into two parts: a _____ and page offset.
iv. The operating system of a computer serves as a software interface between the user and the _____.
v. _____ OS pays more attention on the meeting of the time limits.

(c) Answer following questions in one or two sentences.

i. What is an operating system?
ii. Explain the concept of file.
iii. What is meant by cascading termination?
iv. Why is deadlock prevention necessary?
v. Define single and multiprocessor system

Q. 2 Attempt the following (Any THREE) **(15 M)**

a) Explain System Calls with respect to following: definition, types and execution.
b) What is file management? Write the activities of the operating system in regard to file management.
c) Enlist operating systems services. Describe any four in detail.
d) Write a note on client server computing and peer to peer computing.
e) Explain indirect communication in the message passing system.
f) Write a short note on multithreading models.

Q. 3 Attempt the following (Any THREE) **(15 M)**

a) Draw Gantt chart for FCFS and SJF for the following and find average waiting time.

Process	CPU burst time	Arrival Time
P1	7	0
P2	3	2
P3	5	2
P4	8	2
P5	7	3
P6	9	3

b) Describe safe state deadlock avoidance algorithm.
c) What is swapping? explain in detail.
d) Write different scheduling criterion.
e) Explain semaphores with respect to following points: definition, counting semaphore, binary semaphore, wait operation and signal operation.
f) Write a note on Dinning Philosophers problem.

Q. 4 Attempt the following (Any THREE) **(15 M)**

a) Write a note on segmentation memory management.
b) Briefly explain different file operations.
c) Explain in brief single level and two level directory structure.
d) Write a note on SCAN and C-SCAN scheduling algorithms.
e) Explain the concept of page fault. How can the same be handled by the OS?
f) For the following page reference string calculate number of page faults with OPT and LRU. Frame size = 3.
5 3 2 1 3 4 5 1 2 3 4 5 3 2 4

Q. 5 Attempt the following (Any THREE) **(15 M)**

a) State various responsibilities of child and parent process.
b) Explain the working of TLB.
c) What is a thread? Write benefits of multithreaded programming.
d) Define the following terms: Seek time, Rotational latency, Access time, Transfer time
e) State and explain various techniques of free space management.