Q. P. Code: 20569

(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 5Marks)** (15M)

(a) Multiple Choice Questions.

i. _____ increases CPU utilization by organizing jobs so that the CPU always has one to execute.
a) Memory b) Processor c) Scheduling d) Multiprogramming.

ii. Software may trigger an interrupt by executing a special operation called _____
a) an event b) hit c) a system call d) module

iii. 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, is called _____.
a) Linking b) Race condition
c) synchronization d) process communication

iv. A file is an _____ data type.
a) abstract b) String c) integer d) character

v. 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

(b) **Fill in the blanks and rewrite the sentence.**
(logical address, command line, microkernel , real time, C-SCAN, multiprogramming, compiler)

i. _____ interface uses text commands and a method for entering them
ii. Operating system's _____ approach structures the operating system by removing all nonessential components form the kernel and implementing them as system and user level programs.
iii. In a _____ environment, several processes may compete for a finite number of resources.
iv. An address generated by the CPU is referred to as a _____.
v. In disk scheduling, _____ scheduling moves the head from one end of the disk to the other, servicing requests along the way.

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

i. Write use of a control program?
ii. What is mutual exclusion?
iii. Why deadlock prevention is necessary?
iv. What is the use of base register and limit register?
v. What is a file?

Q. P. Code: 20569

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

`(a) Define single and multiprocessor systems. Write advantages of multiprocessor systems.

(b) Write a note on time sharing operating system.

(c) Enlist operating systems services. Describe any for in detail.

(d) What is a system program? Explain various categories of it.

(e) Describe five state process model .

(f) Write a note on process scheduling.

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

(a) Explain critical section problem in detail.

(b) Write a note on Dinning Philosophers problem.

(c) 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

(d) Write different scheduling criterion.

(e) State and explain different types of data structures used in Banker's algorithm.

(f) Describe safe state deadlock avoidance algorithm.

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

(a) What is swapping? Explain in detail.

(b) Write a note on segmentation memory management.

(c) 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

(d) Briefly explain different file operations.

(e) Explain in brief single level and two level directory structure.

(f) Consider a disk queue with requests for I/O to blocks on cylinders
98, 34, 56, 122, 56, 75, 67, 183
Find total head movement of cylinders of head starts at 56 using FCFS and SSTF scheduling.

Q. P. Code: 20569

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

(a) Describe structure of PCB.

(b) Write a note on Round-Robin algorithm.

(c) Explain the working of TLB.

(d) What is deadlock? Explain necessary conditions required to occur deadlock.

(e) What is a thread? Write benefits of multithreaded programming.

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