Question 1 , 6marks

Multiple Choice Questions

1. Which of the following maintains information about a process?

a) Stack
b) Translation Lookaside Buffer
c) Process Control Block
d) Program Control Block

2. The scheduler that selects which process should be executed next and allocates CPU is called:

a) Long-term scheduler
b) Medium-term scheduler
c) Short-term scheduler
d) High-term scheduler

3. The amount of time which is required to execute a particular process is called:

a) Waiting time
b) Burst time
c) Response time
d) Turnaround time

4. Which of the following is not an advantage of multiprocessor systems?

a) Increasing throughput
b) Increasing reliability
c) Faster execution of processes
d) Reducing reliability

5. A process that cannot affect or be affected by other processes executing in the system is called:

a) A Cooperating process
b) An Independent process
c) A Passive process
d) A Terminated process

6. An abstract hardware of a single computer into several different execution environments is called:

a) Virtual machine
b) CPU scheduling
c) Cloud computing
d) Network Address Translation (NAT)

Question 2 , 6marks

True or False

1. When the time quantum increases, the number of context switches increases. [F]

2. The main memory is the only large storage media that the CPU can access directly. [T]

3. A context switch occurs when the CPU switches from executing one process to another. [T]

4. Protection is used to defend the system against internal and external attacks. [F]

5. SJF scheduling gives maximum average waiting time for a given set of processes. [F]

6. CPU utilization means keeping the CPU as busy as possible. [T]

Question 3 , 6marks

Fill in the Blanks

1. Kernel is the one program running all the time on the computer.
2. Security is the defense of the system against internal and external attacks.
3. System Call are mostly accessed by programs via a high-level API rather than direct-call usage.
4. Short-term scheduler selects which process should be executed next and allocates CPU.
5. Peterson's Solution is a solution to the Critical Section problem.
6. Advantages of process cooperation: Information sharing

Question 4 ,(2+2+2respectively) =6marks

Short Answer Type Questions

1. List and explain two different states a process can be within an operating system.

1-**new** : **the process is being created**
2-**running** : **instructions are being executed**
3-**waiting** : **the process is waiting for some event to occur**
4-**ready** : **the process is waiting to be assigned to a processor**
5-**terminated** : **the process has finished execution**.

2. Describe two general solutions to the Critical-Section Problem and explain how each works.

1-**Mutual exclsion** : **only one process can be in the critical section at a time**
2-**Progress** : **if no process is in the critical section, other shoud be able to enter witout indefinite waiting**
3-**Bounded waiting** : **a process shoud not wait indefinitely to enter its critical**

3. Compare between Indirect Communication and Direct Communication.

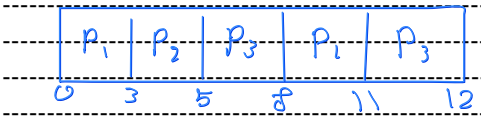
Direct
-Links are established automatically
-The link may be unidirectional, but is usually bi-directional

InDirect
-Link established only if processes share a common mailbox
-link may be unidirectional, or bi-directional

Question 5 =6marks

Process	**Duration** (burst time)
P1	**6**
P2	**2**
P3	**4**

Assumption: All processes arrived at time 0 , Task: Use the (RR) Scheduling technique with q = 3, draw the
Gantt Chart, and calculate the average waiting time.



$$Avg = \frac{((0-0)+(8-3))+3+((5-0)+(11-8))}{3} = \frac{5+3+8}{3} = 5.3$$