

01. Briefly describe the major differences between a **DMA device** and an **I/O processor**.(4%) Describe the difference between **blocking I/O** and **nonblocking I/O**.(4%)
02. Briefly describe the differences among **short-term**, **medium-term**, and **long-term** scheduling.(6%)
03. List four necessary conditions results deadlock.(4%)
04. Explain the difference between internal and external fragmentation.(4%)
05. In paging system, what is “Inverted Page Table”(IPT)?(4%) What is called **page fault**.(3%) Use an example to describe the **LRU page-replacement** algorithm.(4%)
06. What is the cause of **thrashing**?(3%) How does the system detect thrashing?(3%) How can the system do to eliminate such problem.(3%)
07. In interrupt driven systems, what actions should be taken when a I/O interrupt occurs during the execution of a process?(5%) What is **software interrupt (trap)**?(3%)
08. **Dijkstra’s** algorithm solves the all-pairs shortest path problem on a directed graph. Use an example to describe this algorithm.(10%)
09. Write a **recursive** function to find the greatest common divisor (**GCD**) of two positive integers. You can design this procedure by using C, Pascal or Java language.(8%) Rewrite the function to **iterative form**.(5%)
10. Show that “Quick Sort” algorithm takes **$O(n^2)$** times **in worst case**. (7%) Show your answer to avoid such condition.(4%)
11. Describe two search methods for graph traversal: bread first search and depth first search.(8%)
12. **Prim’s** method is used to construct minimum cost spanning tree. Please briefly describe this method.(8%)