



Answer the following questions

- 1) Define what is meant by an algorithm and then show the characteristics of an algorithm.
- 2) Discuss the required steps that involved in designing and analyzing an algorithm.
- 3) State the different ways for specifying an algorithm, then give an example to perform the addition of two numbers.
- 4) Write the steps of the Euclid's algorithm for computing the greatest common divisor (GCD) of two nonnegative integers m and n , and also describe these steps by pseudocode.
- 5) State the difference between O -big oh, Ω -big omega and Θ -big theta nations.
- 6) Prove that
 - i) $100n + 5 \in O(n^2)$
 - ii) $\frac{1}{2}n(n - 1) \in \Theta(n^2)$
- 7) Compute the factorial function $f(n) = n!$ for an arbitrary nonnegative integer n , then write a Matlab code for computing this factorial.
- 8) State the difference between the worst case and best case efficiencies.
- 9) What are the ways which can be used to analysis the algorithm efficiency.
- 10) Discuss the general plan for analyzing the time efficiency of recursive algorithm
- 11) Differentiate between recursive Algorithms and non-recursive Algorithms
- 12) Write an algorithm for linear search.
- 13) find the satisfactory solution of the following Multi-objective linear programming through using fuzzy approach

$$\text{Max } f_1 = -x_1 + 2x_2$$

$$\text{Max } f_2 = 2x_1 + x_2$$

s.t. :

$$-x_1 + 3x_2 \leq 21$$

$$x_1 + 3x_2 \leq 27$$

$$4x_1 + 3x_2 \leq 45$$

$$3x_1 + x_2 \leq 30$$

$$x_1, x_2 \geq 0.$$