

**CHAPTER – 6- SPECIFICATION AND ABSTRACTION**

**I. Answer in brief (2 marks)**

1. Define an algorithm.
2. **Distinguish between an algorithm and a process.**
3. Initially, farmer, goat, grass, wolf = L, L, L, L and the farmer crosses the river with goat. Model the action with an assignment statement.
4. **Specify a function to find the minimum of two numbers.**
5. If  $\sqrt{2} = 1.414$ , and the square\_root() function returns -1.414, does it violate the following specification?  
**--square\_root (x)**  
**--inputs: x is a real number ,  $x \geq 0$**   
**--outputs: y is a real number such that  $y^2=x$**

**II. Answer in a brief (3 marks)**

1. When do you say that a problem is algorithmic in nature?
2. **What is the format of the specification of an algorithm?**
3. **What is abstraction?**
4. How is state represented in algorithms?
5. What is the form and meaning of assignment statement?
6. **What is the difference between assignment operator and equality operator?**

**III. Answer in a paragraph (5 marks)**

1. Write the specification of an algorithm hypotenuse whose inputs are the lengths of the two shorter sides of a right angled triangle, and the output is the length of the third side.

**2. Suppose you want to solve the quadratic equation  $ax^2 + bx + c = 0$  by an algorithm.**

**quadratic\_solve (a, b, c)**

**--inputs : ?**

**--outputs: ?**

You intend to use the formula and you are prepared to handle only real number roots. Write a suitable specification.

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

3. Exchange the contents: Given two glasses marked A and B. Glass A is full of apple drink and glass B is full of grape drink. For exchanging the contents of glasses A and B, represent the state by suitable variables, and write the specification of the algorithm

**IV. Additional Questions (2/3 marks)**

1. What is known as control flow?
2. What is the role of specification of an algorithm?

**V. Additional Questions (5 marks)**

1. List and explain a few basic principles and techniques for designing algorithms.