

**Tutorial Unit 4**  
**M Sc IT II Semester**  
**PS02CINT33: Artificial Intelligence**  
**Prof. Priti Srinivas Sajja**

**Short Questions/Objective Questions**

1. What is GA? (A genetic algorithm is a search heuristic that is inspired by Charles Darwin's theory of natural evolution. This algorithm reflects the process of natural selection where the fittest individuals are selected for reproduction in order to produce offspring of the next generation.)
2. State True or False: The algorithm is based on the process of natural selection—Charles Darwin’s “survival of the fittest.”
3. What is the advantage of an Genetic Algorithms (GA)?  
OR
4. In which situations Genetic Algorithms (GA) should be used?
5. Give an example of binary encoding.
6. Show an example of mutation in binary encoding.
7. Show an example of crossover in binary encoding.
8. What is double site mutation?
9. List possible encoding strategies in Genetic Algorithms (GA).
10. Give two applications of Genetic Algorithms (GA).
11. Define a schema in Genetic Algorithms (GA).
12. What is an instance of a schema?
13. What is an order of a schema?
14. Give two member/instance strings of schema C defined as “\*\*11\*\*”.
15. State True or False: A schema is a template in computer science used in the field of genetic algorithms that identifies a subset of strings with similarities at certain string positions.

### **Big Questions**

16. Give flow chart of GA cycle and explain its phases in brief.
17. Explain how Genetic Algorithms (GA) can be used to solve function optimization problem by taking an example.  
OR
18. Maximize  $f(x) = 2 \cdot x$ , where  $x$  belongs to  $[0,7]$  using Genetic Algorithms (GA).
19. Maximize  $f(x, y) = x+y$ , where  $x$  and  $y$  belong to  $[0,7]$  using Genetic Algorithms (GA).
20. Explain use of edge recombination in Genetic Algorithms (GA) to solve typical traveling salesman problem with 6 cities. Use decimal encoding.