# APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
## 08 PALAKKAD CLUSTER

**Q. P. Code : 2C-17-1** **(Pages: 2)** **Name .....**

**Reg. No: .....**

**SECOND SEMESTER M.TECH. DEGREE EXAMINATION April/May 2017**

**Branch: COMPUTER SCIENCE & ENGINEERING Specialization: COMPUTER SCIENCE & ENGINEERING**

## 08 CS6032 EVOLUTIONARY COMPUTING

**(Common to CS)**

**Time:3 hours** **Max.marks: 60**

**Answer all six questions.**

**Modules 1 to 6:** Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

| Q.no. | Module 1 | Marks |
|---|---|---|
| 1.a | Mention any three applications of evolutionary computing techniques. | 3 |
| | **Answer b or c** | |
| b | Explain about various paradigms of evolutionary computation with examples. | 6 |
| c | What are NP problems? Briefly explain with an example how EC helps to solve such problems. | 6 |

| Q.no. | Module 2 | Marks |
|---|---|---|
| 2.a | List the drawbacks of hill climbing technique. | 3 |
| | **Answer b or c** | |
| b | Write the algorithm for steepest ascent hill climbing and explain how this technique helps to find out an optimized solution for problems that cannot be solved easily. | 6 |
| c | Generate a heuristic function to solve the following problem using hill climbing technique: | 6 |

| | | |
|---|---|---|
| 2 | 8 | 3 |
| 1 | 6 | 4 |
| 7 | | 5 |

should be changed to

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 8 | | 4 |
| 7 | 6 | 5 |

Also explain the algorithm.

| Q.no. | Module 3 | Marks |
|---|---|---|
| 3.a | Describe the tournament selection method with example. | 3 |
| | **Answer b or c** | |
| b | Consider a TSP problem involving 9 cities say A,B,C,D,E,F,G,H,I. For the following parents determine the offspring using edge recombination method. | 6 |

P1=ABCDEFGHI

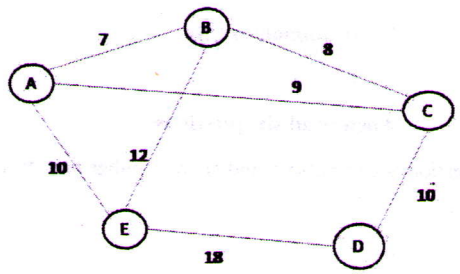
P2=ICGHBFEAD

c Explain the schema theorem and solve the problem using the theorem. Given a string and schemata of length 5. For the following schemata, predict the survival for the generation 1****.Assume Pm=0.2 and Pc= 1. Assume that the population size is 4 and the initial population 11000, 10111, 01011, 00100. Assume the fitness function. **6**

| Q.no. | Module 4 | Marks |
|---|---|---|
| 4.a | Briefly explain about MINMAX ant system. How it differs from normal ant system? | 3 |

**Answer b or c**

b Write an algorithm and solve the TSP problem for the following graph. Given $\alpha=1$, $\beta=1$, $\rho=0.5$.




**6**

c Explain the basic steps involved in simple ACO algorithm. Suggest the local optimal and global optimal conditions that arises while solving NP problems using TSP. **6**

| Q.no. | Module 5 | Marks |
|---|---|---|
| 5.a | What are the basic principles of swarm intelligence? | 4 |

**Answer b or c**

b What is the importance of social networking in PSO? Describe the different types of networking in PSO and list their advantages and disadvantages. **8**

c Write the algorithms for lbest PSO and gbest PSO with necessary equations for velocity updation. **8**

| Q.no. | Module 6 | Marks |
|---|---|---|
| 6.a | Differentiate Abcgbest and Abcgbestdist algorithms. | 4 |

**Answer b or c**

b How ABC algorithm can find out an optimized solution using the principles of bee colony. Give an example. **8**

c How to solve N-Queens problem using ABC algorithm with heuristic information. **8**