BACHELOR OF ENGINEERING IN INFORMATION TECHNOLOGY
3rd YEAR 2nd SEMESTER EXAMINATION, 2019
Artificial Intelligence

Time: 3 Hours Full Marks: 100

ANSWER FROM EVERY GROUP

Group 1 (Answer any one)

1. $5 + 3 + 12 = 20$
   A. Give a comparative assessment of artificial intelligence approaches.
   B. Justify — "No search method that makes use of heuristic functions can guarantee to find the shortest path from start to goal".
   C. Consider the following starting and goal states for the 8-puzzle problem. Solve it using *A algorithm. Possible operators (in order) are: up, down, left, right. Assume that repeated states are not detected. Draw search tree using BFS.

2	8	3
1	B	4
7	6	5

Starting State

1	2	3
8	B	4
7	6	5

Goal State

2. Five missionaries and four cannibals want to cross a river using a boat. The boat can accommodate at most two passengers at a time. If number of cannibals in either bank of the river exceeds the number of missionaries, they will attack the missionaries. Using state-space search approach gives a solution to the above problem. Define starting state, the goal state, the rules, and use the rules to cause state transitions. What would be the necessary changes need to perform in the boundary following task of a robot to make it as a task of placing the agent in the bottom right corner?

Group 2 (Answer any one)

1. $5 + 5 + 5 + 5 = 20$
   a. Discuss about the significance of Intelligent Search in AI.
   b. Explain significances of g and h functions added to form the evaluation function f.
   c. How can you compare different heuristic functions designed for a particular problem?
   d. Why iterative deepening A* is sometimes preferred over A*?

2. $10 + 4 + 6 = 20$
   a) Discuss how will you use Genetic algorithm in engineering Optimization / design problem.
   b) What are the differences between traditional computing and evolutionary computing?
   c) Explain different phases of the evolutionary cycle.

Group 3 (Answer any one) 20

1. Consider the following knowledge-base :
   Tony, Mike and John are members of Himalaya Club (H-C).
   Every Himalaya Club member, who is not a skier, is a mountain climber.
   Mountain climbers do not like rains.

Anyone who does not like snow is not a skier.
Mike dislikes whatever Tony likes, and likes whatever Tony dislikes.
Tony dislikes rain and snow.

A) Represent the above knowledge-base as predicate logic statements.
B) How you can find answer for the query in logic programming: "Is there a member of Himalaya Club, who is not a mountain climber but a skier" by using resolution by refutation method.

Or

2. Explain why a PROLOG interpreter running a PROLOG program cannot be used to prove the negation of an atom.
Consider the following sentences: Any two who are brothers are relatives. If x and z are brothers and z and y are relatives then x and y are relatives. Tony and John are brothers, and John and Mike are brothers. With the above sentences, write a PROLOG program to prove that "Tony and Mike are relatives".

Group 4 (Answer any four) Short note on 4 x 10 = 40

1. Selection and Crossover Operation
2. Crossover vs Mutation Probability
3. Production System and Action Function
4. UCS vs A* vs Best FS
5. NSGA2 vs NSGA
6. Multiobjective Optimization