Indian Institute of Information Technology, Sri City, Chittoor

Name of the Exam: **AI Set: 5** Duration: 50 mins Max. Marks: 20

Read the Instructions before proceeding:

1. This is a **closed book exam**. You can use **a calculator**.
2. **Please Write/Draw legibly**! If we can't understand what you have written, we can't grade it.
3. **Don't use Pencils** for answering/drawing. The final answer **must** be in ink.
4. Submit the answer for each question **separately** (**as two different PDFs**) via **google classroom**

For Office Use only:

	Question 1	Question 2	Total Marks
Marks			
Max Marks	10	10	20

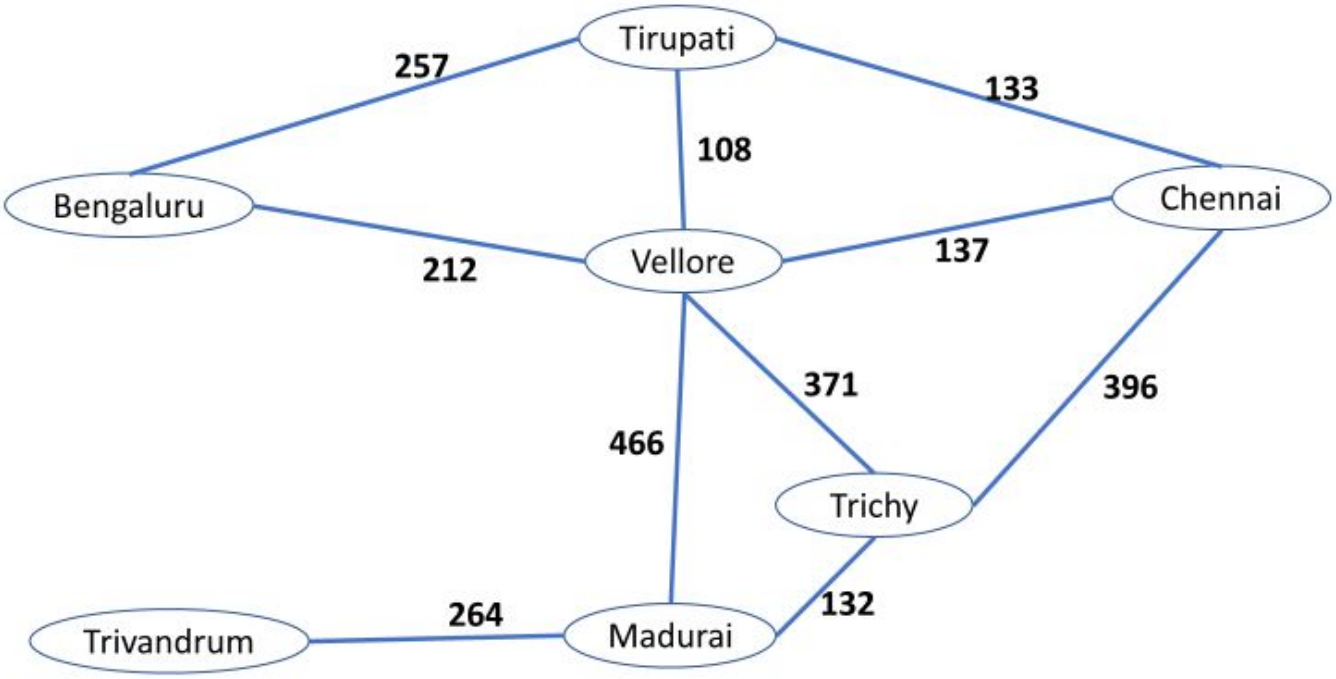
Question 1: ***[Total 10 Marks]***

Describe the motivation behind the simulated annealing algorithm. The following table shows six evaluation functions of a simulated annealing algorithm. For each evaluation give the probability of the next state being accepted (to 4 decimal points). Assume the objective function is being maximised. Ensure you show the formula you use and describe the terms.

Current state	Neighbouring state	Current Temperature
75	65	25
75	55	25
75	65	50
75	55	50
65	75	25
65	75	50

Question 2: Find the path between **Trivandrum (Source) and Chennai(Destination)**. ***[Total: 10 Marks]***

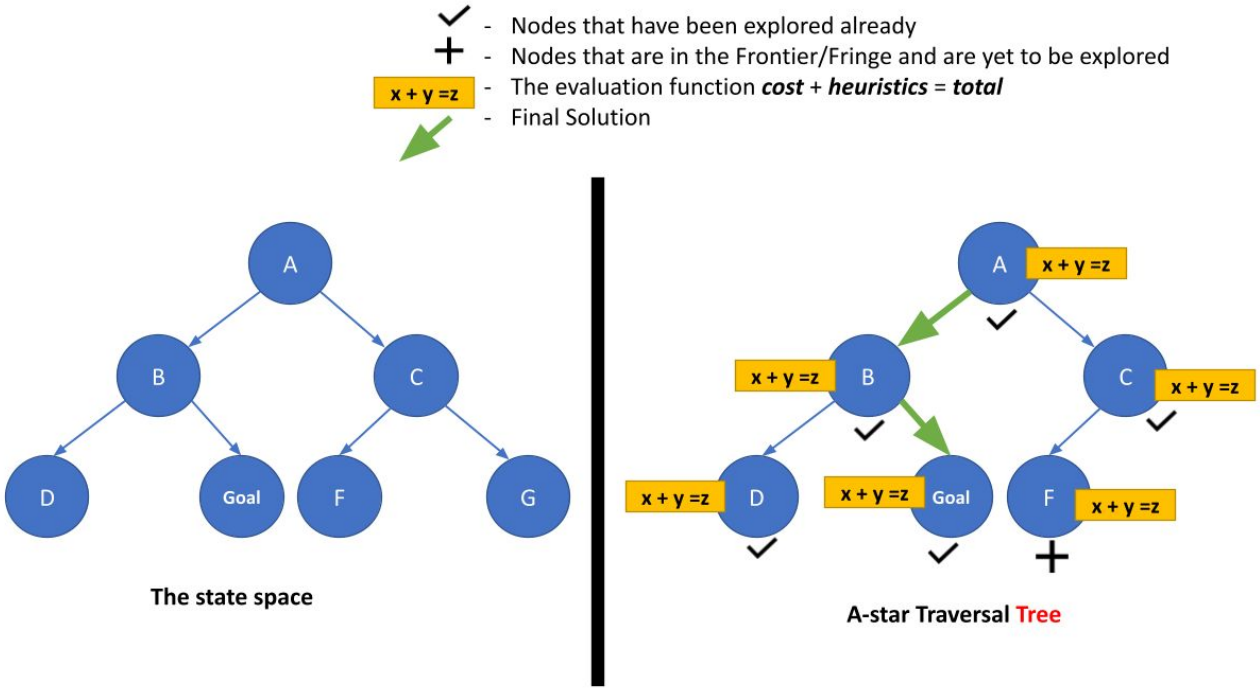
A simplified road map of some south Indian cities is given below. The edge weights represent the distance between the cities in kilometers.



The Straight-line distance from each city to the destination is given in the below table

	Destination	City	SLD
0	Chennai	Bengaluru	291
1	Chennai	Tirupati	111
2	Chennai	Vellore	142
3	Chennai	Chennai	0
4	Chennai	Trichy	306
5	Chennai	Madurai	422
6	Chennai	Trivandrum	612

1. Draw the search **tree** for **A* graph search algorithm**. (*Remember that for both tree-search and graph-search the traversal will always be visualized as a tree.*)
2. Highlight the **explored** and **frontier/fringe nodes** as shown in the below diagram.
3. Show the value of **evaluation function** for each node (as the sum of cost + heuristics) as shown in the below diagram.
4. Highlight the final path found.



Please note that the traversal tree may have multiple nodes representing the same city but different f(n)

You are allowed to use **short-forms** for city names. For example, **use the first and last letter** of the city: BU for Bengaluru, TM for Trivandrum, MI for Madurai, etc. **Do not create your own short-form and Do not use any other unconventional way to present the answer.**