Bachelor Level / fourth-semester / Science Full marks: 60 **Computer Science and Information Technology(CSC261)** Pass marks: 24 (Artificial Intelligence) Time: 3 hours Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.
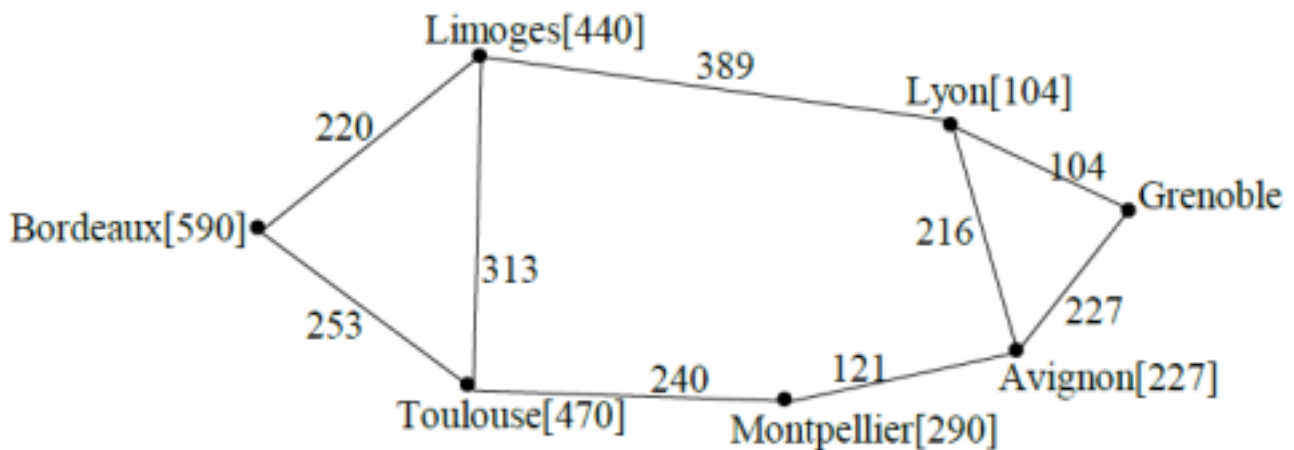
Attempt all questions. (10x6=60)

1. **What do you mean by rational agents? Are rational agents intelligent? Explain.** **2.**

What is Bayes's theorem? Explain its applications.

3. **How can you construct an expert system? Explain knowledge engineering with a block diagram.**

4. **Consider the following map of French cities:**

Apply the A* algorithm to find out a route from Bordeaux to Grenoble. The value v associated with a route between two neighboring cities M and N is the length (in kilometers) of that route. The value [w] associated with a city M is the straight line distance between M and Grenoble. Your solution should show each step of the algorithm.

5. **Consider the following statements.**

All cats like fish, cats eat everything they like, and Ziggy is a cat.

a) Translate the sentences into FOL.

b) Convert the sentences into clausal normal form.

c) Answer using FOL, if Ziggy eats fish?

6. **Consider the following a production system characterized by**

- Initial short term : C5, C1, C3

- Production rules: C1 & C2 àC4

C3 àC2

C1 & C3 àC6

C4 àC6

C5 àC1

Show a possible sequence of two recognize-art cycles. Which will be the new content of the short-term memory after these two cycles?

7. What do you mean by causal network? Explain it with practical application.

8. What is a neural network? Explain the neural net learning methods. 9.

Represent the following sentences into a semantic network.

      Birds are animals.

       Birds have feathers, fly and lay eggs.

       Albatros is a bird.

       Donald is a bird.

       Tracy is an albatross.

10. Differentiate between natural language understanding (NLU) and natural language generation (NLG).