Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1720203 **Date: 04-12-2014**

Subject Name: Artificial Intelligence

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

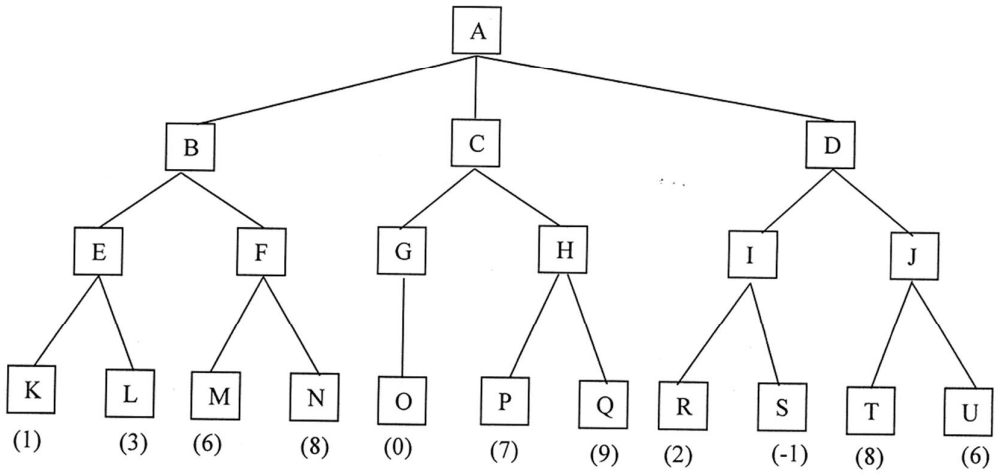
Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** What is Artificial Intelligence and AI Technique? Briefly explain how AI Technique can be represented. List out some of the task domain of AI. **07**

(b) What is production system? Discuss the characteristics of a Production system. **07**

Q.2 **(a)** Consider the following game tree: **07**



Suppose the first player is the maximizing player.

(i) What move should be chosen?

(ii) What node would not need to be examined using Alpha-Beta pruning?

(b) Explain problem reduction with respect to AO* algorithm. **07**

OR

(b) Define heuristic search. Also discuss the benefits and shortcomings of it. **07**

Q.3 **(a)** Consider the following sentences: **07**

- John likes all kinds of food.
- Apples are food.
- Anything anyone eats and isn't killed by is food.
- Bill eats peanuts and still alive.
- Sue eats everything Bill eats.

Translate these statements into formulas in predicate logic.

Prove that John likes peanuts using resolution.

(b) Explain non-monotonic reasoning and discuss various logic associated with it. **07**

OR

Q.3 **(a)** Explain Dempster-Shafer theory with an example. **07**

(b) What is wrong with the following argument? **07**

- Men are widely distributed over the earth.
- Socrates is a man.
- Therefore, Socrates is widely distributed over the earth.

Q.4 **(a)** Explain Samuel's rote-learning procedure. Could it be applied to chess? Why (not)? **07**

(b) Explain error back-propagation in multilayer network. **07**

OR

Q.4 **(a)** Explain Genetic Algorithm and its Applications. **07**

(b) Explain following terms: **07**

- Perceptron
- Adaptability
- Activation Function
- Requirement of Hidden layer

Q.5 **(a)** Let X be the universe of military aircraft of interest, as defined below: **07**

X = {a10, b52, b117, c5, c130, f4, f14, f15, f16, f111, kc130}

Let A be the fuzzy set of bomber class aircraft:

$$A = \left\{\frac{0.2}{f16} + \frac{0.4}{f4} + \frac{0.5}{a10} + \frac{0.6}{f15} + \frac{0.8}{f111} + \frac{1.0}{b117} + \frac{1.0}{b52}\right\}$$

Let B be the fuzzy set of fighter class aircraft:

$$B = \left\{\frac{0.1}{b117} + \frac{0.3}{f111} + \frac{0.5}{f4} + \frac{0.8}{f15} + \frac{0.9}{f14} + \frac{1.0}{f16}\right\}$$

Find the following various set combinations for these two sets:

$A \cup B$ $\quad A \cap B$ $\quad \bar{A}$ $\quad \bar{B}$

$A|B$ $\quad B|A$ $\quad \bar{A} \cup B$

(b) Write short note on: **07**

- DENDRAL
- MYCIN

OR

Q.5 **(a)** What do you mean by fuzzification and defuzzification? Explain the following methods of defuzzification: **07**

- Centroid method.
- Weighted average method.

(b) Explain the basic architecture of an expert system. Also give its applicability in different areas with suitable examples. **07**

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