



Printed Pages : 4

TCS – 603

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1079

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2006-07

ARTIFICIAL INTELLIGENCE

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1. Attempt any **four** parts of the following:- **5×4=20**

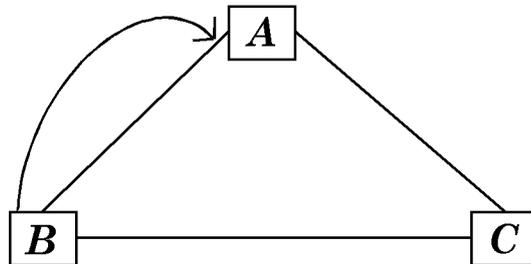
- (a) Explain intelligence and artificial intelligence systems. How do they distinguish.
- (b) Explain with example how does conventional computing differ from the intelligence computing.
- (c) Specify a global database, rules and termination condition for a production system to solve the following water jug problem. Given a 4 litre jug filled with water and an empty 3 litre jug how can one obtain precisely 2 litre water in 3 litre jug water may either be discarded or poured from one jug to another or fill with water pump.
- (d) Describe how Branch and Bound Technique could be used to find the shortest solution to a travelling salesman.

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[Contd...

- (e) Explain the effect of over-estimation and under-estimation of it on A* algorithm.
- (f) The AO* algorithm can be modified to work on graph that contain cycle. This might be desirable in order to avoid the effort required to prevent them. What changes must be made in algorithm? Make sure that you can correctly handle the graph shown below when the cost of a node c is changed.



2. Attempt any **two** of the following:- **10×2**

- (a) Describe in detail the differences between language understanding and language generation. Explain the problem in developing a program which is capable of carrying on a dialog with a group of people.
- (b) What do you understand by a conceptual dependency graph ? Give the conceptual dependency graph for the sentence.

‘Mary drove her car to office’ and describe the steps required for a programme to transform the sentence to an internal conceptual dependency structure.

- (c) What is per sing? Explain TOP DOWN and BOTTOM UP parsing in detail for a given following grammar :
- $S \rightarrow NP VP$
 $NP \rightarrow ART N$
 $VP \rightarrow V VP$
 $N \rightarrow \text{boy / frog}$
 $V \rightarrow \text{ate/kissed}$
 $ART \rightarrow \text{the / a}$
- Where S is the initial symbol for sentences?
 NP is noun phrase
 VP is verb phrase
 N is noun
 V is verb
 ART is article
- Apply this grammar on following sentence.
 A boy ate the frog and write top down and bottom up parsing.

3. Attempt any **two** of the following : **10×2**

- (a) Represent following sentences in symbol logic :
- (i) All students like good teachers.
 - (ii) All that glitters is not gold.
 - (iii) Fruits and vegetables are delicious.
 - (iv) God helps those who help themselves.
 - (v) Jack and Jill went up the hill

- (b) for the set

$$S = \{P \vee Q, \sim Q \vee R, \sim P \vee Q, \sim R\}$$

- (i) Derive an empty clause from S by resolution.
- (ii) Show that

$$(\exists z)(\forall x)[p(x) \Rightarrow Q(z)] \text{ and}$$

$$(\exists z)[(\exists x)p(x) \Rightarrow Q(z)] \text{ are equivalent.}$$

- (c) How the knowledge can be represented in semantic nets. Explain it. Draw the semantic network of sentence.
Bobby gives Arisha a gift.

4. Attempt any **two** of the following :

- (a) Give the advantages of expert-system. Architecture based on decision trees over those of production rules with example. What are the main disadvantages ?
- (b) What are the salient activities required in knowledge acquisition system achieved through interaction between domain experts ? Explain with the help of example. Also explain the need of self-explanation system.
- (c) Explain how the meta knowledge used in expert system. Interference. Explain with example. What is an AI shell?

5. Attempt any **two** of the following :

- (a) Give the structure of a PROLOG program and discuss it's features of searching into knowledgebase.
- (b) What is an object define with the help of decision theoretic classification in detail. How an object or an item and its properties can be represented in LISP?
- (c) What is clustering? How learning of pattern recognition through clustering is done ? Write an algorithm to implement the pattern recognition of objects.

