DATE : ___/___/_____
PAGE : _____

a) Date and Time of examination: 04/04/2022 ; 9:00 AM

b) Examination Roll number : 2123474057

c) Name of the Program : M.Sc. Computer Science

d) Semester / Year : I / 1st year

e) Unique Paper code (UPC) : 223411102

f) Title of the Paper : Artificial Intelligence

(2)

9123474705 7

DATE : __/__/____
PAGE : _____

Answer 4: (a) Various levels of Natural language processing are —

→ Level 1 - Phonetics & Phonology -

It identifies and interprets the sound that makeup words when the machine has to understand the spoken language.
A set of closely related speech sounds (phones) is regarded as a single sound.
example :- the sound of "s" in sed, bring or round is a phoneme.

→ Level 2 - Morphology, lexicon -

Morphology is how the words are formed from smaller units called morphemes. It converts words into smaller units ending root radical, affix, topic and theme vowel.
example :- foxes : fox + es morphological parsing.

foxes stems to fox

→ Level 3 - Syntax, Parsing

It concerns with how words are group together in larger chunks, namely phrases and sentences.
It analyzes formation of sentences and specification of structures allowed in language.
example - The cat sat on the mat // Valid
On the the sat cat mat // Invalid

→ Level 4 - Semantics

Semantic analysis concerns the meaning of individual words.
example - watch (I, terrapin)

It can be "I watched the terrapin"
or "The terrapin was watched by me".

→ level 5 - Pragmatics

It concerns how sentences are used in different situations and how use affects the interpretation of the sentence.
example - Could you turn in your exam now (command)
Could you finish the exam? (question, command)

→ Level 6 - Discourse

It concerns how sentences are group together in larger units of communication. It is used for multi-sentence processing.
example - I saw the ostrich with a telescope.
He stole it from the nearby store.

(4)

DATE: / /
PAGE:

(b) i) $W = \{P(a, x, f(g(y))), P(z, f(z), f(u))\}$

$K = 0$ $W_0 = W$, $\sigma_0 = \varepsilon$

Disagreement set, $D_0 = \{a, z\}$

$\sigma_1 = \sigma_0\{a/z\} = \{a/z\}$

$W_1 = W_0\{a/z\}$

$= \{P(a, x, f(g(y))), P(a, f(a), f(u))\}$

$K = 1$ $D_1 = \{x, f(a)\}$

$\sigma_2 = \sigma_1\{f(a)/x\}$

$= \{a/z, f(a)/x\}$

$W_2 = W_1\{f(a)/x\}$

$= \{P(a, f(a), f(g(y))), P(a, f(a), f(u))\}$

$K = 2$ $D_2 = \{g(y), u\}$

$\sigma_3 = \sigma_2\{g(y)/u\}$

$W_3 = W_2\{g(y)/u\}$

$= \{P(a, f(a), f(g(y)))\}$ singelton set.

$K = 3$ W_3 is singelton

Hence, m.g.u (most general unifier) is $\{a/z, f(a)/x, g(y)/u\}$

(5)

2123474705 7

DATE: / /
PAGE:

ii) $W = \{ knows(Mother(y), y), knows(Father(x), x) \}$

Disagreement set

$= \{ Mother(y), Father(x) \}$

Unification is not possible as Mother & Father are different functions.

Hence the given set is not unifiable.

(c) Exterior angle A is denoted by $EXT\angle A$

Predicates :

(1) Equal (sum($\angle A, \angle B, \angle C$), 180)
(2) Equal (sum($\angle A$, EXT($\angle A$)), 180)

Rules :

(3) Equal (X, Y), Equal (Z, Y) → Equal (X, Z)
(4) Equal (sum(X, Y), sum(X, Z)) → Equal (Y, Z)
(5) Equal (Y, Z) → Equal (Z, Y)

To prove : (conclusion)

(1) Equal (sum($\angle A, \angle B, \angle C$), 180)
Equal (sum($\angle A$, sum($\angle B, \angle C$)), 180)

(2) Equal (sum($\angle A$, EXT($\angle A$)), 180)

212347470S7

DATE : / /
PAGE :

(3) $Equal(X,Y), Equal(Z,Y) \rightarrow Equal(X,Z)$

$\sim(Equal(X,Y) \wedge Equal(Z,Y)) \vee Equal(X,Z)$

$\sim Equal(X,Y) \vee \sim Equal(Z,Y) \vee Equal(X,Z)$

(4) $Equal(sum(X,Y), sum(X,Z)) \rightarrow Equal(Y,Z)$

$\sim Equal(sum(X,Y), sum(X,Z)) \vee Equal(Y,Z)$

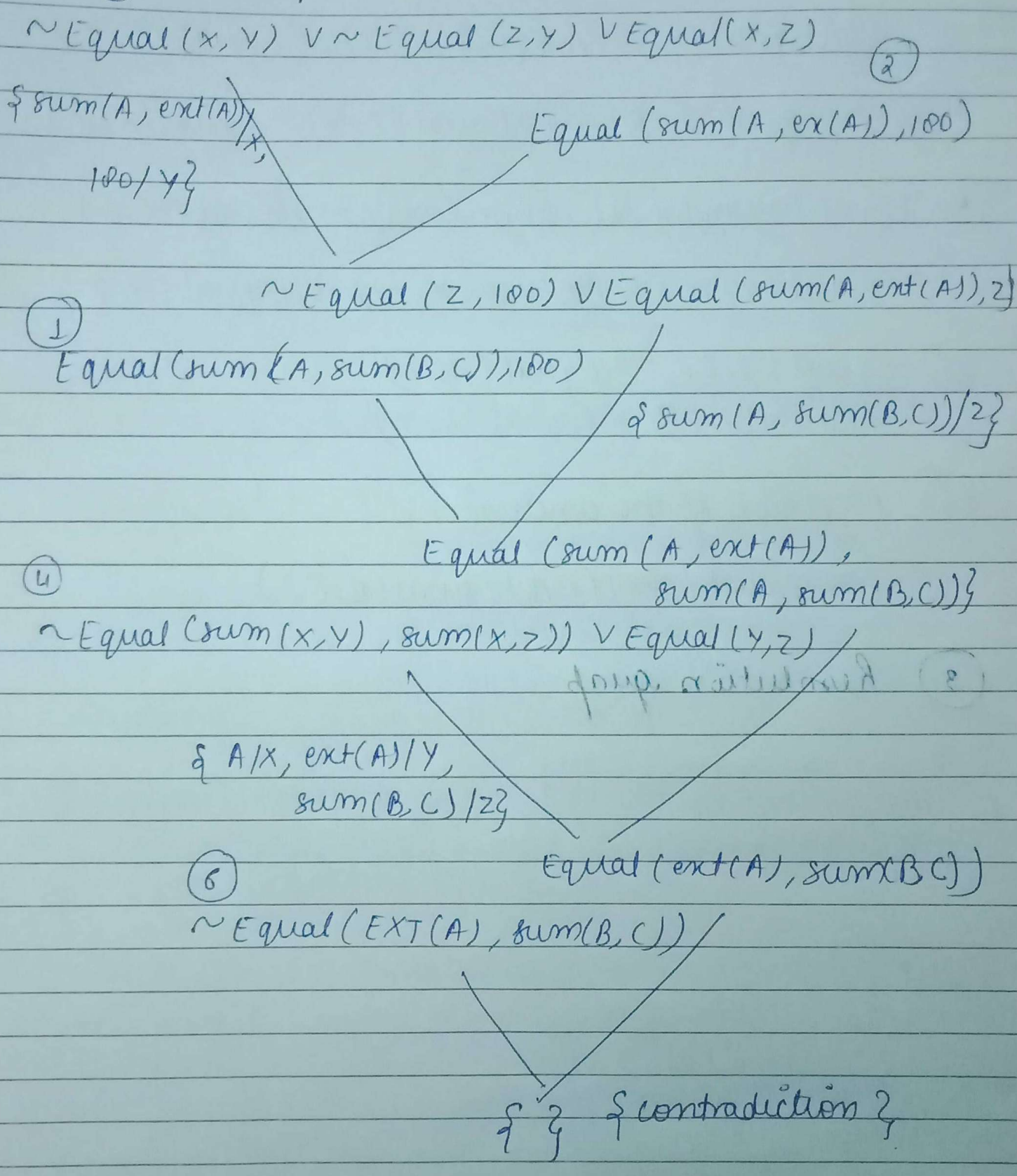
(5) $Equal(Y,Z) \rightarrow Equal(Z,Y)$

$\sim Equal(Y,Z) \vee Equal(Z,Y)$

(6) Negation of the conclusion:

$\sim Equal(EXT(CA), sum(B,C))$

Resolution Graph



Hence, the conclusion is true.