

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: IT**

**SEMESTER: VII/ADD
SESSION : MO/2018**

SUBJECT : IT7025 ARTIFICIAL INTELLIGENCE

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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- Q1 (a) What is artificial Intelligence (AI)? List the major advantages and disadvantages of artificial intelligence over natural intelligence. [2]
(b) Differentiate the following terms (any two): [2X1.5=3]
I) Knowledge and Belief.
II) Procedural Knowledge and Declarative Knowledge.
III) Weak AI and Strong AI.
- Q2 (a) The Turing test has often been incorrectly interpreted as being a test of whether or not a person could distinguish between responses from a computer and response from a person. How does this differ from the real Turing test? Are the two tests equivalent? If not, explain why they are not? [2]
(b) Define the terms Knowledge base and inferencing. Briefly describe the meaning of knowledge representation and knowledge acquisition. [1+2=3]
- Q3 (a) Describe the data structures in Lisp: the atom, the list and the String. Explain how we get items into a property list and how we retrieve values from a property list. [2]
(b) (I) Recall the definition of Fibonacci numbers: [2X1.5=3]
$$\text{Fib}(n) = 1 \quad \text{for } n = 0 \text{ or } n = 1$$
$$\text{Fib}(n) = \text{Fib}(n-1) + \text{Fib}(n-2) \quad \text{for } n > 1$$
Write a LISP program for the above definition of Fibonacci numbers by using recursion and predicate function zerop.
(II) Write a LISP program by using a 'lambda function' to evaluate the roots of the quadratic equation: $ax^2 + bx + c = 0$ using the formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
- Q4 (a) Write a PROLOG program to count VOWELS in a list of characters. [2]
(b) (I) Explain CUT and FAIL predicates in PROLOG. [1+2=3]
(II) Write Prolog program to solve 'Monkey banana problem' problem. Problem Statement: A hungry monkey is in a room. Suspended from the roof, just out of his reach, is a bunch of bananas. In the corner of the room is a box. The monkey desperately wants the bananas, but he can't reach them. What shall he do? After several unsuccessful attempts to reach the bananas, the monkey walks to the box, pushes it under the bananas, climbs on the box, picks the bananas and eats them. The hungry monkey is now a happy monkey.
- Q5 (a) Define logic? What are the differences between Propositional Logic and Predicate Logic. [2]
(b) (i) Define the terms with an example: I) wffs II) Atomic sentences. [1+2=3]
(ii) Convert the following wff into Clausal form:
$$\exists x \forall y (\forall z P(f(x), y, z) \rightarrow (\exists u Q(x, u) \wedge (\exists v R(y, v))))$$

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Q6 (a) Define Unification with an example.

[2]

(b) Consider the following axioms:

[3]

1. Every child loves Santa.
2. Everyone who loves Santa loves any reindeer.
3. Rudolph is a reindeer, and Rudolph has a red nose.
4. Anything which has a red nose is weird or is a clown.
5. No reindeer is a clown.
6. Scrooge does not love anything which is weird.
7. (Conclusion) Scrooge is not a child.

(i) Translate these sentences into predicate logics.

(ii) Prove the conclusion using Resolution.

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