CLASS: BE   SEMESTER: VII
BRANCH: IT   SESSION : MO/2019

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.

Q1   (a)   (I) Sate the relationship between the terms "intelligence" and "knowledge".   [1+1=2]
                  (II) What is artificial intelligence? Write down its advantages and disadvantages.
        (b)   Differentiate the following terms **(any two):**   [2x1.5=3]
                  a) Data, Belief and Hypotheses
                  b) Procedural, Declarative and Heuristic knowledge
                  c) Epistemology and Metaknowledge.

Q2   (a)   The Turing Test has often been incorrectly interpreted as being a test of whether   [2]
                  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?
        (b)   (I) What is the use of inference engine? Discuss the importance of knowledge base   [1.5+1.5=3]
                  system.
                  (II) Briefly describe the meaning of knowledge representation and knowledge
                  acquisition.

Q3   (a)   (I) What is the difference between logic and Prolog Programming? Explain with an   [1+1=2]
                  example.
                  (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:
                  $x = (-b \pm \sqrt{(b^2 - 4ac)})/2\,a$.
        (b)   **(I)** Write LISP code to find Fibonacci Series using Recursion and Iteration.   [1.5+1.5=3]

                  (II) How can we find the minimum and maximum elements in a list in LISP?

Q4   (a)   Implement PROLOG program to compute greatest common divisor (GCD) of two   [2]
                  non-negative integers. This predicate should be called gcd and, given two non-
                  negative integers in the first two argument positions, should match the variable in
                  the third position with the GCD of the two given numbers.
                                          Examples: ?- gcd(57, 27, X).
                                          X = 3.
        (b)   Explain CUT and FAIL predicates in PROLOG. Implement a PROLOG program by using   [3]
                  predicate occurrences to count the number of occurrences of a given element in a
                  given list.
                  Example: ?- occurrences(dog, [dog, frog, cat, dog, dog, tiger], N).
                   N = 3.

Q5   (a)   Compare Propositional Logic and Predicate Logic. What are the inference rule of   [2]
                  propositional logic?
        (b)   Define the terms with examples (I) wffs (II) Clauses. Convert given wff to clause   [3]
                  form:
                  X={Roman(x) $\wedge$ know (x, Marcus)] $\rightarrow$[hate(x, Caesar)$\vee$($\forall$y: $\exists$z: hate(y, z) $\rightarrow$think
                  crazy(x, y))]

Q6　(a)　Trace the operation of unification algorithm on the following pairs of literals:　[2]
　　　　S: $\forall$x,y In(x, y) $\wedge$ Climate(y, moderate) $\rightarrow$ Climate(x, moderate)
　　　　T: In(Italy, Europe)
　　(b)　Given the following information for a database:　[3]
　　　　A1: If x on top of y, y support x.
　　　　A2: If x is above y and they are touching each other, x is on top of y.
　　　　A3: A cup is above a book.
　　　　A4: A cup is touching a book.
　　　　　　(a)　Translate statements A1 through A4 into clausal form.
　　　　　　(b)　How that the predicate supports (book, cup) is true using resolution.

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