BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : V**
BRANCH: CSE **SESSION : MO/19**

SUBJECT: CS8101 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

TIME: 3 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Differentiate between Declarative knowledge and Procedural knowledge [2]

Q.1(b) What is Knowledge-based system? How it can be generated? [4]

Q.1(c) Design an intelligent strategy to play Tic-Tac-Toe game. Justify your solution strategy. [6]

Q.2(a) What is Mapcar and lambda function? Using proper example show the use of these two functions. [2]

Q.2(b) Write the output of the following [4]

(i) ((setq x ′(3+5))
(ii). (Member ′b ′(a b d))
(iii). (cdr car ′(a (b c) d))
(iv). (append ′(a) ′(b c))

Q.2(c) Write a LISP function to create a list of elements which are obtained by a series of X^Y , where X=1,2,3,4……,10 and y=5. [6]

Q.3(a) What are facts, predicate and clause? Give one example on each. [2]

Q.3(b) Consider the following set of facts: [4]

(i) John likes all kind of foods.
(ii) Apples are food.
(iii) Chicken is food.
(iv) Anything anyone eats and isn't killed by is food.
(v) Bill eats peanuts and still alive.
(vi) Sue eats everything Bill eats.

Prove John like peanuts using backward chaining.

Q.3(c) Consider the following set of facts: [6]

(i) Anyone passing his engineering examination and winning the lottery is happy.
(ii) But anyone who studies or is lucky can pass all his examinations.
(iii) Ram did not study but Ram is lucky
(iv) Anyone who is lucky wins the lottery.

Answer by resolution" Is Ram happy"?

Q.4(a) Write a schemata for default reasoning for the statement: "If someone is an adult and it is consistent to assume that adult can vote, infer that person can vote". [2]

Q.4(b) Explain how Bayesian Probabilistic Inference and Dumpster-Shafer theory is used in uncertainty. [4]

Q.4(c) Consider the following facts: [6]

(i) Most things do not fly
(ii) Most birds do fly, unless they are too young or dead or have broken wing
(iii) Penguins and Ostriches do not fly
(iv) Magical Ostriches fly
(v) Tweety is a bird
(vi) Chirpy is either a Penguin or an Ostrich
(vii) Feathers is a magical Ostrich

Use Non-monotonic reasoning and show the Truth Maintenance System to answer

(I) Does Chirpy fly?
(II) Does Tweety fly?

Does Antara (human being) fly?

PTO

Q.5(a) How object-oriented concepts can be incorporated in AI implementation through any language say LISP? Explain with example. [2]

Q.5(b) Show the conceptual dependency for the following statements: [4]

(i) Since smoking can kill you, I stopped.

(ii) While going home, I saw a frog

Q.5(c) Write is Script for going to watch a movie in a picture hall. [6]

Q.6(a) What do you mean by Heuristic search? [2]

Q.6(b) What are the basic differences in searching strategy within the search space for Hill Climbing, Steepest Ascent Hill Climbing, Best First and A* technique? [4]

Q.6(c) [6]

Initial state Goal State

For the above 8 puzzle problem the initial state and final state is given. Using sliding to legal movements, find the shortest solution using A* Algorithm that never overestimates the number of steps to the goal.

The legal moves can be that result from trying the four actions (blank moves Left, Right, Up, or Down). Also state the basis of movements in the search space to reach the goal state.

Q.7(a) What is an Expert System? Name some Expert Systems? [2]

Q.7(b) What is Expert System Shell? Discuss about Knowledge System building tools? [4]

Q.7(c) Draw the block diagram of Expert system and explain each component [6]

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