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CSE401

Enrol. No.202....

[ET]

END SEMESTER EXAMINATION : APRIL-MAY 2022

ARTIFICIAL INTELLIGENCE

Time : 3 Hrs.

Maximum Marks : 60

Note: Attempt questions from all sections as directed.

SECTION – A (24 Marks)

Attempt any four questions out of five.

Each question carries 06 marks.

1. (a) Explain various methods of problem reduction representations and their importance.

(b) How means-ends analysis, solves a problem by considering the obstacles that stand between the initial problem state and the goal state? Explain.

2. Differentiate :

(a) Declarative and Procedural Knowledge (3)

P.T.O.

(930)

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- (b) Forward and Backward Reasoning (3)
3. Why Syntactic analysis play important role in AI?
Generate the ~~context free~~ grammar to create the parse tree for the sentence: "Bill went for a walk to the park with a golden bowl." (2+4)
4. Explain the role of knowledge engineer to develop expert system. Why inference engine is called as brain of expert system? Explain. (3+3)
5. Explain the various trajectory planning of robot. In which application areas we required such planning? Explain.

SECTION - B (20 Marks)

Attempt any two questions out of three.

Each question carries 10 marks.

6. Describe the importance of joint in robotics. Explain the following joints with the help of picture: Linear, Orthogonal, Rotational, Twisting and Revolving. Draw the six degree of freedom in robot by using neat and clean diagram. (3+4+3)

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7. (a) Learning is very important w.r.t expert system. How learning automation is different from learning by induction? Explain.
- (b) Suppose a doctor knows that a meningitis causes a stiff neck in 50% of cases. She also knows that the probability in the general population of someone having a stiff neck at any time is $1/20$. She also has to know the incidence of meningitis in the population ($1/50,000$). Using Bayes' rule calculate the probability the patient has meningitis. (5+5)
8. (a) Draw the conceptual dependency of following sentences :
- John sold his car to Bill
The ball fell from the roof
Jenny cried
Merry went to India
- (b) Write a Script for the 'food market'. Mention the following explicitly in the script.
- (i) Entry conditions

P.T.O.

(930)

(ii) Results

(iii) Props

(iv) Roles

(v) Scenes

(vi) Track

(4+6)

SECTION - C

(16 Marks)

(Compulsory)

9. (a) (i) Sometimes analysis is useful for many human “planning” activities. You are hungry, you need change, a secretary is available, and you don’t know anything, and you want to get to a state in which you are no longer hungry.
- (ii) Apply Means-ends analysis (MEA) to find a valid solution. How can you say that MEA is a strategy to control search in problem-solving? Justify your statement with facts.

- (ii) Trace the constraint satisfaction procedure solving the following cryptarithmetic problem :

POINT + ZERO = ENERGY

(8)

(930)

✓ (b) Consider the following axioms :

1. All hounds howl at night.
2. Anyone who has any cats will not have any mice.
3. Light sleepers do not have anything which howls at night.
4. Krish has either a cat or a hound.
5. If Krish is a light sleeper, then Krish does not have any mice (Conclusion).

Now Complete the following steps :

- ✓ (i) Write each axiom as a well-formed formula in first-order predicate calculus
- ✓ (ii) Convert step I into CNF
- (iii) prove the conclusion by resolution method
 $(2+3+3=8)$

(1100)

(930) ✓