

Reg. No.

Question Paper Code

11856

12 JUN 2023

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL/MAY 2023

Sixth Semester

Computer Science and Engineering

(Common to Information Technology & Computer and Communication Engineering)

20CSPC601 – ARTIFICIAL INTELLIGENCE

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Define an Agent in Artificial Intelligence. | 2,K1,CO1 |
| 2. List out the steps in problem – solving process. | 2,K1,CO1 |
| 3. What is Alpha Beta Pruning? | 2,K1,CO2 |
| 4. List out the drawbacks of Hill-Climbing Search. | 2,K2,CO2 |
| 5. “All men are Mortal
Socrates is a man”
Prove that Socrates is Mortal using Predicate Logic. | 2,K2,CO3 |
| 6. What is ontological commitment (what exists in the world) of First Order Logic? Represent the sentence “Brothers are siblings” in First Order Logic. | 2,K2,CO3 |
| 7. Give suitable examples of false negative and false positive hypotheses. | 2,K2,CO4 |
| 8. Mention the components of the planning system. | 2,K1,CO4 |
| 9. Define Augmented Grammar. | 2,K1,CO5 |
| 10. List the different types of chat bot. | 2,K1,CO5 |

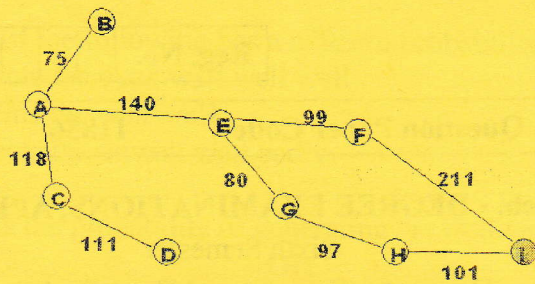
PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Represent the Following Agent in PEAS Description. 13,K2,CO1
- (i) Taxi Driver Agent
 - (ii) Medical Diagnosis System
 - (iii) Part-Picking Robot
 - (iv) Interactive English Tutor
- OR**
- b) Describe the Best First Searching Strategy and solve the following problem using the same. 13,K3,CO1

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

11856

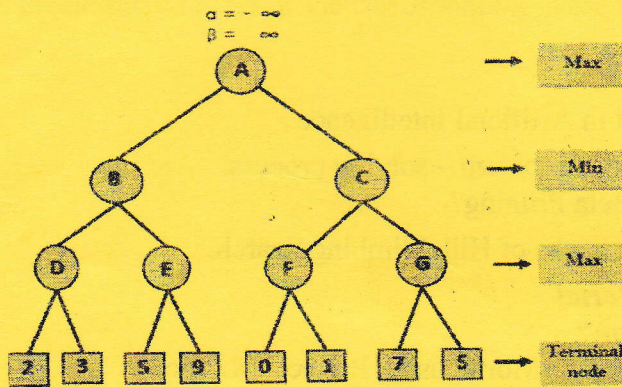


$h(n) : A - 366, B - 374, C - 329, D - 244, E - 253, F - 178, G - 193, H - 98, I - 0$

12. a) Discuss in the detail the Constraint Satisfaction Problem with the algorithm for solving a Crypt Arithmetic Problem. 13, K3, CO2

OR

b) Solve the problem by using Alpha-Beta Pruning. 13, K3, CO2



13. a) Consider a vocabulary with the following symbols: 13, K3, CO3
Occupation(p, o): Predicate, Person p has occupation o.
Customer(p1, p2): Predicate, Person p1 is a customer of person p2.
Boss(p1, p2): Predicate, Person p1 is a boss of person p2.
Doctor, Surgeon, Lawyer, Actor: Constants denoting occupations.
Emily, Joe: Constants denoting people.

Use these symbols to write the following assertions in First-Order Logic:

- i. *Emily is either a surgeon or a lawyer.*
- ii. *Joe is an actor, but he also holds another job.*
- iii. *All surgeons are doctors.*
- iv. *Joe does not have a lawyer (i.e., is not a customer of any lawyer).*
- v. *Emily has a boss who is a lawyer.*
- vi. *There exists a lawyer all of whose customers are doctors.*
- vii. *Every surgeon has a lawyer.*

OR

- b) Convert the following formula into Clause form with sequence of steps: 13,K3,CO3

$$\forall x: [Roman(x) \wedge Know(x, Marcus)] \rightarrow [hate(x, Ceaser) \vee (\forall y: \exists z: hate(y, z) \rightarrow thinkcrazy(x, y))]$$

14. a) Explain partial order planning algorithm with an example. 13,K2,CO4

OR

- b) *Monkey-Banana Problem Description:* A hungry monkey is in a room, and is near the door. The monkey is on the floor. Bananas have been hung from the center of the ceiling of the room. There is a block (or chair) present in the room near the window. The monkey wants the banana, but cannot reach it. If the monkey is clever enough, he can come to the block(or chair), drag the block(or chair) to the center, climb on it, and get the banana. 13,K3,CO4

Goal state : Monkey reaches the Bananas.

Write the initial state description for above problem and the action sequences for solving the same with FOPL.

15. a) Discuss in detail the various applications of Natural Language Processing. 13,K2,CO5

OR

- b) What are the characteristics of Information Retrieval? How do Bayes' Rule apply to IR Systems? 13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) Consider the following PCFG for simple verb phrases:

0.1 : VP → Verb

0.2 : VP → Copula Adjective

0.5 : VP → Verb the Noun

0.2 : VP → VP Adverb

0.5 : Verb → is

0.5 : Verb → shoots

0.8 : Copula → is

0.2 : Copula → seems

0.5 : Adjective → unwell

0.5 : Adjective → well

0.5 : Adverb → well

0.5 : Adverb → badly

0.6 : Noun → duck

0.4 : Noun → well

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

11856

- (i) Which of the following has a nonzero probability as a VP? 8,K3,CO6
(a) shoots the duck well well well
(b) seems the well well
(c) shoots the unwell well badly

- (ii) What is the probability of generating "is well well"? 7,K3,CO6

OR

- b) Consider the sentence "Someone walked slowly to the supermarket" 15,K3,CO6
and a lexicon consisting of the following words:

Pronoun → someone *Verb* → walked

Adv → slowly *Prep* → to

Article → the *Noun* → supermarket

Construct the Grammar combined with the lexicon, to generate the above given sentence. Show the corresponding parse tree(s).