[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 10210 **L**

Unique Paper Code : 2342202403

Name of the Paper : Artificial Intelligence

Name of the Course : **B.A. (P)**

Semester : IV

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section A** is compulsory.
3. Attempt **any 4** questions from **Section B**.
4. Parts of a question must be answered together.

Section A

Q1 (a)	What is constraint satisfaction problem?	2
(b)	Transform the following sentence into disjuntive normal form: ~(A ∨ ~B) &(C⟶D).	3
(c)	Define and explain Modus ponens rule with the help of an example.	3
(d)	Develop a parse tree for the sentence "Meera sat on the chair" .	3
(e)	What are the limitations of hill climbing search algorithm ?	3
(f)	What would be the output of the following statement in Prolog? Explain ?- A is 4+3, B= 5+2,A=B.	4
(g)	Differentiate between breadth first search and depth first search algorithm.	4
(h)	Write a Prolog program to generate the nth term of Fibonacci series.	4
(i)	Differentiate between fully obsevable and partially observable environment.	4

P.T.O.

Section B

Q2 (a) Differentiate between deterministic and non-deterministic parser with the help of suitable diagrams. 6

(b) What are various types of agents? 5

(c) Transform the following into Conjunctive Normal Form(CNF):

(i) A V (~A & B & C) 4
(ii) (~A & B) V (A & ~B) & D

Q3 (a) Express the following concepts as an associative network structure with interconnected nodes and labeled arcs. 6

DUCKS is a game development company. Three departments within the company are Human Resource Development, Administration and Software Development. Tejas is the manager of Software Development. Rohan and Raghav are the programmers. Raghav is married to Radhika. Radhika is working for NPL. They have three children and their live on Mahatma Gandhi road, Raghav wears shoes and is 5 feet 7 inches tall.

(b) Describe the working of a learning agent with the help of a block diagram. 5

(c) What is Knowledge Representation in AI. Why Is It Important? 4

Q4(a) What is Recursive Transition Network (RTN) ? Explain with the help of an example. 6

(b) What is an Expert System. Describe its main component ? 5

(c) Given the following grammar - 4

S → NP VP
NP→ N
NP→ DET N
VP→ V PP
PP→ PREP NP
N → Vikram/table
V→ ate
DET→ the
PREP→ on

Derive the parse tree for the sentence -

" Vikram ate on the table"
using the above grammar.

Q5(a) Given the following statements - 8
a) Whoever can read is literate
b) Elephants are not literate
c) Some elephants are intelligent also.
d) Gaja is an elephant

Use resolution to prove that "some intelligent beings cannot read" 4

(b) Compare and contrast between Propositional Logic and First-Order Predicate Logic. 3

(c) What is Chomsky's hierarchy of grammars ?

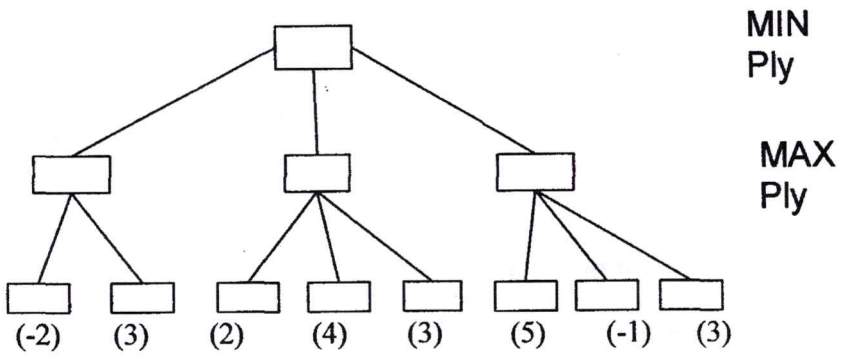
Q6(a) Solve the cryptarithmetic problem using: 6

SEND
+ MORE
MONEY

(b) Define unification. Find whether the following sets are unifiable or not? If they are unifiable, find most general unifier (m.g.u.) else give justification why they are not unifiable. 5

I. {S(x, Raghu), S(y, Isha)}
II. {P(x, y), P (f(x),z), P(z, x)}

(c) Consider the following game tree with ply depth 2 ,in which the indicated scores are from the MIN player's point of view .What move should MIN choose, and why? 4



Q7 (a) Define A* search algorithm and write its evaluation function. 5

(b) Write a script for going to a restaurant. 5

(c) Create a frame for four wheeler passenger vehicles (Cars, Vans, Buses) and give one complete frame in detail for Buses which includes the slots for the main component parts, their attributes, and relations between parts. 5