35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is an intelligent agent? How does learning agent work? [8]
2. What do you understand about well defined problems? Explain about problems that can be solved using production rules with an example. [2+6]
3. Discuss about the evaluation criteria for search algorithm. State the problems in hill climbing search algorithm. [4+4]
4. Why CNF is necessary? "Everyone who loves all animals are loved by someone" represent this statement in FOPL and explain all the steps involved to convert it into CFN. [2+6]
5. What is knowledge representation? How semantic network is used to represent knowledge? [2+6]
6. What do you understand by swarm intelligence? Suppose chromosomes are of the form x = a b c d e f g h with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as: [2+8]

   $f(x) = (a+b)-(c+d)+(e+f)-(g+h)$ and let the initial population consist of four individuals with the following chromosomes.
7. What is Natural Language Processing (NLP)? Discuss the different steps in NLP with suitable examples. Also list down major issues in NLP. [6+2+2]
8. Explain Hopfield network with an example. [8]
9. Write short notes on: [3×4]

   i) Predicate logic
   ii) Unsupervised learning
   iii) Breadth first vs depth first search

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Baisakh

Exam.	Back		
Level	BE	**Full Marks**	80
Programme	BCT	**Pass Marks**	32
Year / Part	III / II	**Time**	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define AI. What is the importance of Turning Test in AI? List applications of AI. [2+4+2]
2. What is problem space? Solve the following crypto arithmetic problem by showing all the steps. [2+6]

   BASE + BALL = GAMES
3. Discuss the hill climbing search algorithm along with problem associated with it and discuss their solutions. Why simulated annealing is important? [6+2]
4. Given premises "Every American who sells weapons to hostile nations is a criminal. The country XYZ is enemy of America. All of its misallies in XYZ were sold by Donald, who is an American." Prove that Donald is a criminal by using FOPL based resolution refutation method. [8]
5. Why CNF is required? Explain all the steps used to convert a quantified statement with suitable example. [2+6]
6. Why semantic network and frames are important in AI? Provide examples of both with FOPL statements example. [2+6]
7. What is a genetic algorithm? Explain all steps in genetic algorithm with block diagram and operators. [8]
8. List the importance of expert system in real life. Draw block diagram of expert system architecture and explain all blocks. [2+6]
9. What is a McCulloch/Pitts neural network? Explain it with reference to AND gate. Justify that it cannot be applied to Exclusive OR gate. [8]
10. Justify that NLP is one of the important part of an AI. Explain the steps involved in the NLP. [8]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is a rational agent? "System that think like humans" and "System that act like humans" are the part of artificial intelligence. Justify these statement with practical example. [1+6]
2. Define constraint satisfaction problem (CSP). Solve the following crypto-arithmetic problem, where different letters denote different integers and identical letters denote same integer. SWIM + WEAR = RELAX. [1+6]
3. Why Searching is important in problem solving? What do the drawbacks of greedy best-first search and how A* search algorithm solve it. Explain with an example. [2+7]
4. a) Assume the following facts: [8]
   - John likes all kinds of food.
   - Apples are food.
   - Chicken is food.
   - Anything anyone eats and isn't killed by is food.
   - Bill eats peanuts and is still alive.
   - Sue eats everything bill eats.

   Prove that John likes peanuts using resolution.

   b) Differentiate between forward and backward chaining. [4]
5. What is Frame? How is it different from semantic net in knowledge representation? [7]
6. Define inductive Learning. Explain in detail about ID3 process with suitable example. [2+6]
7. What is self-organizing Map (SOM)? Explain all the steps involved in SOM with suitable example. [2+5]
8. Justify that the study of gene is one of important part in the AI. List down the steps involved in genetic algorithm with an example. [4+4]
9. How knowledge acquisition is performed in expert system? Explain one real expert system example with proper architecture. [2+5]
10. Write short notes on: (Any two) [2×4]
    a) Machine Vision
    b) Supervised Vs Unsupervised learning
    c) Back Propagation Algorithm

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Magh

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define Artificial Intelligence (AI). Describe the importance and practical application of AI. [6]
2. A farmer has a goat, a wolf and a cabbage on the west side of a river. He wants to get all of his animals and his cabbage across the river onto the east side. The farmer has a row boat but he only has enough room for himself and one other thing. The wolf will eat the goat if they are left together alone. The goat will eat the cabbage if they are left together alone. How can the farmer get everything on the east side? [8]

   i) Formulate this puzzle as search
   ii) Solve this problem-using search (any method)
   Draw the search tree and show the final solution
3. Devise an example to show how A* algorithm uses path cost and heuristic cost to generate best solution. [8]
4. Consider the following axioms: [10]

   i) Anyone whom Mary loves is a football star
   ii) Any student who does not pass does not play
   iii) John is a student
   iv) Any student who does not study does not pass
   v) Anyone who does not play is not a football star.

   Prove that "If John does not study, then Mary does not love John" Resolution by Refutation.
5. A doctor is called to see a sick child. The doctor has prior information that 90% of sick children in that neighborhood have the flu, while the other 10% are sick with measles. Let F stand for an event of a child being sick with Flu and M stand for an event of a child being sick with measles. Assume for simplicity that there no other maladies in that neighborhood. A well-known (and common) symptom of measles is a rash and has probability of 0.95. [8]

   However, very occasionally, children with flu also develop rash and has probability of 0.08.

   Upon examining the child, the doctor finds a rash. What is the probability that the child has measles?
6. Explain Frames and Semantic Net with examples. List down their advantages and limitations. [4+4]
7. What is Fuzzy Logic and why is it important? Explain about Mamdani Fuzzy Inference Method with example. [3+7]
8. What do you understand by Perception? How can we design a neural network that acts as an XOR gate? [1+7]
9. Differentiate between declarative knowledge and procedural knowledge. Describe expert system with its architecture and practical uses. [3+5]

41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. If the Turing Test is passed, does this show that computers exhibit intelligence? State your reasons. [7]
2. Solve the following puzzle by assigning numeral (0-9) in such a way that each letter is assigned unique digit which satisfy the following addition. [7]

   ONE + ONE + TWO = FOUR
3. Explain the necessity of searching techniques in AI? Differentiate between Breath first search and Depth first search with their performance criteria. [4+5]
4. Assume the following facts: [8]

   i) Horses, cows, pigs are mammals
   ii) An offspring of a horse is a horse
   iii) Bluebeard is a horse
   iv) Bluebeard is Charlie's parent
   v) Offspring and parent are inverse relations
   vi) Every mammal has a parent

   Prove Charlie is a horse using resolution refutation.
5. What is causal net? How does Bayes Theorem calculate the probability in a causal net? Explain with example calculation. [7]
6. Convert given sentences into Semantic Network. [7]

   i) The height of the adult male is 5.10
   ii) Baseball player is an adult male.
   iii) Adult male is a person.
   iv) Batting average of Baseball players is 0.252
   v) Pee-wee-Reese is a Fielder.
   vi) Fielder is Baseball player.
   vii) Team of pee-wee-Reese is Brooklyn Dodger.
7. "Learning is an essential characteristic for intelligent agents." List down justification on this statement. Write about the role learning with suitable example. [4+4]
8. What are applications of Expert System? Describe the Development stages of Expert System briefly. [2+6]
9. Define a NLU and a NLG. List down the different steps involved in the natural language processing (NLP) with suitable examples. [2+7]
10. Define Hebbian learning. Use Hebbian learning algorithm to Construct Hebbian Network which perform line AND Function. [3+7]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Ashwin

Exam.	Regular		
Level	BE	**Full Marks**	80
Programme	BCT	**Pass Marks**	32
Year / Part	III / II	**Time**	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is an Artificial Intelligence (Al)? Explain any two applications of Al in real field. [7]
2. What do you understand by Constraint satisfaction problem? Solve the following Crypt-arithmetic problem. [1+6]

```
  SEND
+ MORE
 MONEY
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3. What is a searching? Explain Breadth First Search and Depth First Search and compare their performance criteria. [9]
4. What is a knowledge, representation and reasoning? Describe forward chaining with practical example. [2+5]
5. Assume the following facts: [7]
   - John likes all kinds of food.
   - Apples are food.
   - Chicken is food.
   - Anything anyone eats and isn't killed by is food.
   - Bill eats peanuts and is still alive.
   - Sue eats everything Bill eats.

   Prove that John likes peanuts using resolution refutation
6. What are semantic nets and frames? How frames are useful in semantic nets. [7]
7. What is a machine learning? Explain in detail about Boltzmann machines with suitable algorithm and explanations. [2+8]
8. What is a neural network? Explain the back propagation algorithms and perceptron. [2+4+4]
9. What is an expert system? Explain its advantages and disadvantages. [8]
10. What is a Natural Language Processing? Describe Natural Language Processing Steps and its application. [2+6]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Define AI. When a machine is said to be passed Turing test? Give any two examples of constraint satisfaction problem. [2+5+1]
2. Solve the following crypto-arithmetic problem, where different letters denote different integers and identical letters denote same integer. WRONG + WRONG = RIGHT. Explain the steps that you have followed. [5+3]
3. Differentiate between informed and blind search. How depth search is different to breadth first search. Compare with evaluation parameters. [4+4]
4. All oversmart persons are stupid. Children of oversmart presons are naughty. Ram is children of Hari. Hari is oversmart. Show that Ram is naughty. Using FOPL based resolution method. [8]
5. Explain the step involved in conjunctive normal form (CNF) with suitable example. [8]
6. What is semantic net? Explain with suitable example. [8]
7. What is machine vision? Discuss about the algorithm of Genetic Algorithm. [2+6]
8. What is neural network? Explain back-propagation algorithm learning. [4+4]
9. What is an Expert System? Explain the steps of an Expert System development. [4+4]
10. Define machine translation in NLP. Explain the challenges of machine translation. [1+7]

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Magh

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What is Artificial Intelligence (AI)? Discuss brief history of AI with Chronological development. [2+6]
2. Why searching is necessary in AI? Explain about the role of production system with suitable example. [2+6]
3. What is horn clause? Differentiate between Depth First Search and Breadth First Search. [1+7]
4. Explain backward chaining with suitable example and compare with forward chaining. [4+4]
5. Why do we need FOPL? State any three rules of inference. How can we make the machine with learning capacity? [2+3+3]
6. Define Boltzmann Machine. How knowledge can be represented using semantic network? Explain with suitable example. [1+7]
7. What is Machine Learning? What is Fuzzy Logic? Explain the Fuzzy Inference with suitable example. [2+6]
8. Differentiate declarative knowledge and procedural knowledge. Explain the architecture of expert system. [2+6]
9. What is the role of perceptron in neural network? Explain about bakpropagation algorithm. [3+5]
10. What is Natural Language Processing (NLP)? Discuss the different issues related with NLP with example. [2+6]

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chitra

Exam.	Old Back (2065 & Earlier Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence *(EG743CT)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. **Define Artificial Intelligence (AI)? Justify that"AI makes machine working more human friendly". [8]**
2. **Define expert system. What are the building blocks of expert system? [8]**
3. **Compare the search strategy of breadth first search with depth first search. [8]**
4. **Convert the following sentences in to FOPL and hence into CNF [8]**
   - i. **Everyone likes someone.**
   - ii. **All the students who visited science museum are not engineering student.**
   - iii. **Sumit likes all fruits that are rich vitamin A.**
   - iv. **Shyam likes all the movies that Krishna likes.**
5. **Explain learning framework with suitable example. [8]**
6. **What is backward chaining? Explain with suitable example. [8]**
7. **What are the different operators associated in genetic algorithm. [8]**
8. **Differentiate between supervised learning and unsupervised learning. [8]**
9. **Explain the different issues of Natural Language Processing (NLP). [8]**
10. **Explain different forms of knowledge modelling techniques. [8]**

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41 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division.
2069 Bhadra

Exam.	Regular (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Artificial Intelligence *(CT 653)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Discuss any two fields of your daily life where artificial intelligence has been applied. (7)
2. Solve the following crypto-arithmetic problem, where different letters denote different integers and identical letters denote same integer. LOGIC + LOGIC = PROLOG
   Show all the step of solving through constraint satisfaction problem. (7)
3. Discuss the hill-climbing search algorithm along with problems associated with it and discuss their solutions. (9)
4. Given premises: Every American who sells weapons to hostile nations is a criminal. The country Abc is enemy of America. All of the missiles in Abc were sold by John. John is an American.
   Proof: John is a criminal. (10)
5. What are the different knowledge representation models? Discuss semantic nets with an example. (7)
6. What is Fuzzy learning? Explain with a practical example. (4)
7. Explain the learning framework with suitable example. (6)
8. What is a Hopfield Network? Explain all the steps involved in the Hopfield Network with suitable example. (8)
9. Explain different steps of expert system development with an example. (8)
10. What is a natural language processing? Explain it. (6)
11. Write short notes: (any two) (4 x 2 = 8)
    i. Skolemization
    ii. Machine vision
    iii. Human Brain verses Neural Network

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ ***All** questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. **Define and differentiate between "system that think like humans" and "system that act like humans". What are the ethical issues in the artificial intelligence?**

2. **How can you convert to conjunctive normal form? Explain all the steps with suitable examples.**

3. **"All married employees earning Rs. 225,000 or more per year in Nepal pay taxes. All unmarried employees earning Rs. 200,000 or more per year in Nepal pay taxes. The university professor of Nepal earns Rs. 400,000 and has to pay 25% taxes. No other employee earns more than the professor in the university. Some of Nepalese citizens earn less that Rs. 200 per day and they don't have to pay any taxes". Represent the above sentences in first-order logic and explain each step.**

4. **Draw the block diagram of the structure of an expert system and explain it. How can you represent expert system using if-then rules?**

5. **What is a depth first search? Explain it with required algorithm. How can you modify it to be an informed search?**

6. **Explain in detail about ID3 process with suitable example. Explain different factors involved in the learning.**

7. **What is a fuzzy logic and explain its importance? Explain the steps involved in the fuzzy logics.**

8. **What is a McCulloch/Pitts neural network? Explain it with reference to AND gate. Justify that McCulloch/Pitts neural network can't be applied to EX_OR gate.**

9. **Explain in detail about forward chaining with suitable example. What are the applications of forward chaninig?**

10. **Explain the importances of natural language processing. What are the issues in the natural language processing?**

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. **Justify that "system that thinks rationally" and "system that acts rationally" is important part of artificial intelligence with examples.**
2. **Explain all the steps involved in the conjunctive normal form with suitable practical examples. How can you realize it using suitable hardware?**
3. **"A key property of deductive systems is that they are purely syntactic, so that derivations can be verified without considering any interpretation. Thus a sound argument is correct in every possible interpretation of the language, regardless whether that interpretation is about mathematics, economics, or some other area." Represent the above sentences in first-order logic and explain each step.**
4. **What is an expert system? Draw the block diagram of an expert system and explain it. Explain the importance of if then rules in the expert system.**
5. **Justify that the application of queue is important in the searching. Explain any one informed search technique involving queue along with its algorithm.**
6. **What do you mean by ID3 process? Explain in detail about ID3 process with suitable example.**
7. **Justify that the study of gene is one of the important part in the AI. Explain the steps involved in the genetic algorithm.**
8. **What do you mean by supervised learning? Explain any one type of supervised learning with practical example.**
9. **What do you mean by forward chaining? Explain it with suitable block diagram. Differentiate it with backward chaining.**
10. **Differentiate between natural language understanding and natural language generating. Explain the different steps in the natural language processing.**

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. **What do you mean by data driven reasoning? How can you relate with chaining? Explain it with practical examples.**

2. **Is Turing test important in the artificial intelligence? Explain it with suitable diagram and examples.**

3. **What is a first order predicate logic? How do you convert it to the disjunctive normal form? Explain with suitable examples.**

4. **"The Department of Electronics and Computer Engineering offers two undergraduate degrees, Computer Engineering and Electronics and Communication Engineering. Almost 75% of those courses are similar. If the students of any of those engineering programs study another one year more can be eligible to get both degrees. Only some of them may be interested to get Bachelor in Computer, Electronics and Communication Engineering". Represent the above sentences in first-order predicate logic and explain each step.**

5. **Justify that informed search is the modification of blind search. Explain in detail about simulated annealing with practical examples.**

6. **Differentiate between supervised and unsupervised learning. Explain about learning framework with suitable block diagram and examples.**

7. **What is a Boltzmann machines? Explain its algorithm with suitable explanation and example.**

8. **What do you mean by hetro-associative structure? Explain it with suitable example and its limitation.**

9. **Compare expert systems and human experts. Explain each point with suitable practical examples.**

10. **Justify that natural language processing is one of the important part of an artificial intelligence. Explain the steps involved in the natural language processing.**

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33 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Bhadra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. What do you mean by forward chaining? Why it is required? Explain it with two practical examples.
2. Justify that "System that think rationally" and "System that act rationally" are the part of artificial intelligence. Explain it with practical examples.
3. How do you convert to conjugate normal form? Explain all the steps with suitable practical examples.
4. "A deductive system is sound if any formula that can be derived in the system is logically valid. Conversely, a deductive system is complete if every logically valid formula is derivable. All of the systems discussed in this article are both sound and complete. They also share the property that it is possible to effectively verify that a purportedly valid deduction is actually a deduction; such deduction systems are called effective". Represent the above sentences in first-order logic and explain each step.
5. Justify that AI can't exist without searching. Explain in detail about any two types of informed search with practical examples.
6. Why do we require learning? Explain about learning framework with suitable block diagram and examples.
7. How a genetic idea can be converted to an algorithm? Explain all steps of genetic algorithm in brief.
8. What is a Hopfield Network? Explain all the steps involved in the Hopfield Network with suitable example. Compare it with Kohonen Network.
9. Why do we require expert system structure? Draw the block diagram and explain it with practical examples.
10. Explain the different steps involved in the natural language processing (NLP) with suitable block diagram and examples.

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31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Shrawan

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define and differentiate between "system that think rationally" and "system that act rationally". AI research is ethical justify it.

2. Why conjunctive normal form is required? Explain all the steps with suitable practical examples.

3. "All married employees earning Rs. 140,000 or more per year in Nepal pay taxes. All unmarried employees earning Rs. 115,000 or more per year in Nepal pay taxes. The president of Nepal earns Rs. 2,500,000 and has to pay maximum taxes. No other employee earns more than the president. Some of Nepalese citizens earn less that Rs. 100 per day and they don't have to pay any taxes". Represent the above sentences in first-order logic and explain each step.

4. Briefly explain different types of practical expert systems. Explain in detail about any one practical expert system used in the medical application.

5. Justify that AI can't exist without searching. Explain in detail about hill climbing searching and compare it with simulated annealing method.

6. Explain different factors involved in the learning? Explain in detail about ID3 process with suitable example.

7. What is a genetic algorithm and explain its importance? Explain the steps involved in the genetic algorithm.

8. Compare between computer and brain. Differentiate between supervised and unsupervised learning with suitable example.

9. Is an expert system important, justify it. Explain in detail about forward chaining with suitable example.

10. Why you have to study natural language processing? Explain the issues in the natural language processing.

31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Kartik

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ ***All** questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Define an artificial intelligence (AI). Explain the behaviors of the AI. What do you mean by Turing test? Explain it.
2. Why disjunctive normal form is required? Explain all the steps with suitable practical examples.
3. "A person born in Nepal, and whose parents is a Nepali citizen by birth, is a Nepali citizen by birth. A person born outside Nepal, and one of whose parents is a Nepali citizen by birth, is a Nepali citizen by descent. Several developed countries have dual citizenship provision, but Nepal doesn't have that provision". Represent the above sentences in first-order logic and explain each step.
4. Differentiate between inference and reasoning. Why probabilistic reasoning is important in the AI? Explain with suitable example.
5. Justify that searching is one of the important part of AI. Explain in detail about depth first search and breadth first search techniques with suitable example.
6. Define learning. Why learning frame work is required? Explain about learning frame work with suitable block diagram and examples.
7. What is a genetic algorithm? Explain its applications. Explain all steps of GA in brief.
8. What is a back propagation? Explain all the steps involved in the back propagation with suitable example.
9. How can you construct expert system? Explain knowledge engineering with suitable block diagram.
10. Define a natural language processing. Explain the different issues involved in the natural language processing.

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31 TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2064 Jestha

Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Artificial Intelligence

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *All questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. **List all categories of artificial intelligence and explain them with suitable examples.**
2. **Why conversion to clausal form is required? Explain all the steps with suitable examples.**
3. **Justify that "MYCIN" is a probabilistic reasoning with derivations and example.**
4. **Explain the importance of searching. Explain in detail about any two informed search techniques with suitable example.**
5. **What is an inductive learning? Why learning frame is required? Explain with suitable block diagram and examples.**
6. **Explain about semantic networks and frames with suitable examples.**
7. **Define a genetic algorithm and explain its importance. Explain different steps of genetic algorithm in brief.**
8. **Explain how brain works. Explain the mathematical representation of neural network system along with its algorithm.**
9. **Define an expert system. Differentiate between forward chaining and backward chaining with suitable examples.**
10. **Why natural language processing is required? Explain the issues in information extraction, information retrieval and machine translation in the natural language processing.**