CLASS XII

CHAPTER 5

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

I . Multiple Choice Questions

I. Who brought the concept of AI ?

a) Vector Allis **b) Marvin Minsky**

c) Alan Turing **d) John McCarthy.**

Ans : (d) John McCarthy.

1. Which type of AI focuses on single set of abilities and performs a particular task ?

a) Super AI **b) Narrow AI**

c) General AI **d) None of these**

Ans : (b) Narrow AI

3. Which one of AI type does not have memory for data storage

a) Limited Memory **b) Things of Mind**

c) Reactive Machines **d) Self Awareness**

Ans : (C) Reactive Machines

4. The conversion of natural language into computer understandable form

a) Intrusion Detection **b) Machine Translation**

c) Identification **d) None of these.**

Ans : (b) Machine Translation

5. Brain of expert system is:

a) Knowledge Base **b) Inference engine**

c) User Interface **d) None of these**

Ans : (b) Inference Engine

6. Place where knowledge from the human expert is collected

a) Domain expert **b) Knowledge Base**

c) User **d) All of these**

Ans : (b) Knowledge Base

7. Robots which provides help for analyzing the collected data are

a) Healthcare Robots **b) Domestic Robots**

c) Military robots **d) Research robots.**

Ans : (d) Research Robots

II. Fill in the blanks :

I. **Artificial Intelligence is divided into two types I and II.**

II. **Deep Blue is a chess playing computer developed by IBM.**

III. **Apple Siri is a good example of narrow artificial intelligence.**

IV. **Reactive Machine have no memory.**

V. **MYCIN and PXDES are examples of earlier expert systems**

VI. **Fourth Generation Robots are smart as humans.**

III . Write the Full form of the following:

I AI – Artificial intelligence

II. GAI- General Artificial Intelligence

III. NLP – Natural Language Processing

IV. SAI – Strong Artificial Intelligence

PART - B

IV. Short Answer type Questions :(Write the answers in 4-5 lines)

I. What is artificial intelligence?

Ans. Artificial Intelligence is coined from two words

a) Artificial meaning man made.

b) Intelligence is capacity of mind to understand principles, truth, facts or meanings to acquire knowledge and apply it to practice.

It is a machine created by man to make life easy and comfortable. It encompasses many disciplines like data science, machine learning etc.

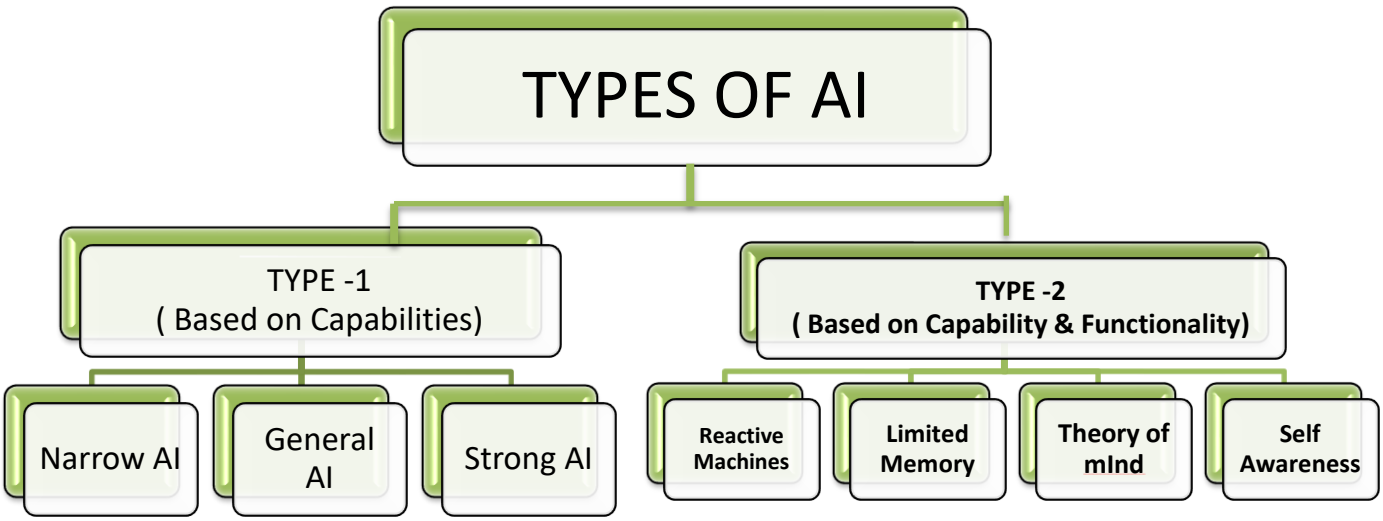
2. What are types and subtypes of AI ? Depict them with the help of diagram.

Ans. Based on capabilities and functionality AI is categorized into mainly two types :

Type 1 and Type 2 .

Type I of the AI is based upon the capabilities in comparison with human being. Its Subtypes are Narrow AI, General AI, Strong AI.

Type 2 of the AI is based upon the functionality and capability in comparison to the Human Beings. Its Subtypes are Reactive Machines, Limited Memory, Theory of Mind and Self-Awareness.



3. Differentiate between narrow AI and general AI?

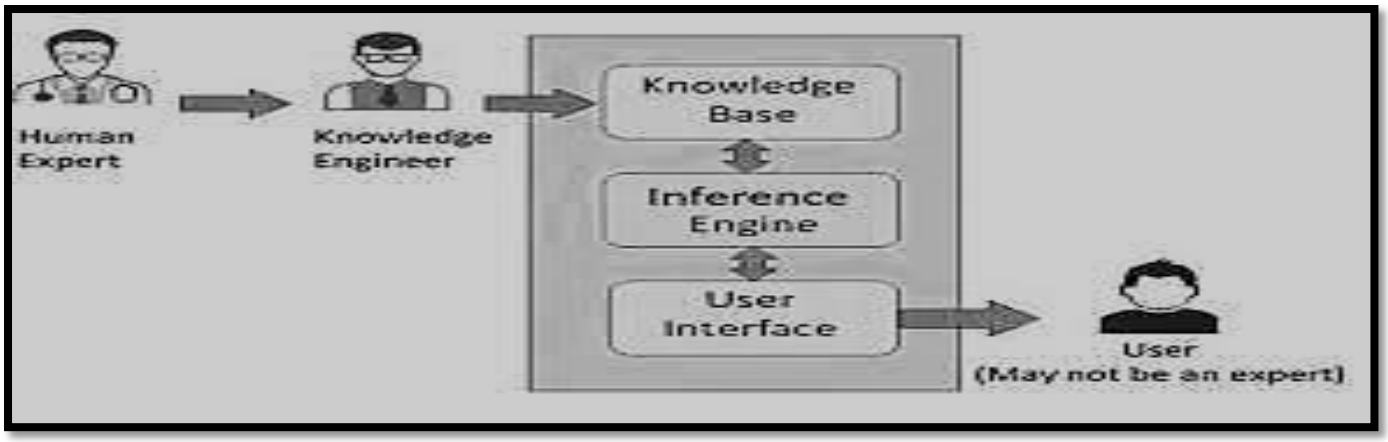
Ans. Narrow AI and general AI are subtypes Type I Artificial Intelligence. The difference between the two is:

	NARROW AI	GENERAL AI
1.	It is a type of artificial intelligence in which specific dedicated tasks are performed with intelligence.	In this type of artificial intelligence computer system can perform any generalized task given just like human beings.
2	It focuses on single set of abilities and performs that task.	It performs generalized task like human beings.
3.	These systems perform only in their defined fields	It has equal efficiency as humans.
4.	It is also called Weak AI	It is more complex than narrow AI.

4. What do you mean by expert systems? Give examples of expert systems.

Ans. Expert systems are computer programs derived from computer science branch Artificial Intelligence. It is a type of software that uses knowledge base to solve a problem. It is program that converts knowledge of an expert into software. These are created to find solution of complex problems in particular area.

Examples of expert system are : DENDRAL, MYCIN, CADET , PXEDS.



Block diagram of Expert System

5. What is the difference between the human system and expert system?

Ans. The difference between Human system and expert system is

SNO	HUMAN SYSTEM	EXPERT SYSTEM
1.	It is subject to destruction.	It is permanent.
2.	Humans are unpredictable.	These are consistent.
3.	These are not easily transferable.	These are easily transferable.
4.	Human experts are expensive.	These are less expensive as compared to human.

Q 6. What are limitations of Expert Systems?

Ans. Limitations of expert systems are:

1. **Expert systems cannot make decisions like Humans.**
2. **They don't possess human capabilities.**
3. **They can produce correct result from less amount of knowledge.**
4. **They require excessive training.**

Q 7. Summarize about some computer languages used in the field of AI ?

Ans. Some computer languages used in field of AI are :

1. **Python : It is widely used. It's Syntax is very simple and easy to learn. AI algorithms can be easily implemented in this language.**
2. **R : It is most effective language. It is an environment for analyzing and manipulating the data for statistical purposes.**
3. **Lisp : It is one of oldest language. It was invented by John McCarthy in 1958.**
4. **Prolong : It is widely used for medical projects. It is also used for designing expert systems.**
5. **Java : It is good choice for AI development. It is used with search algorithms, artificial neural networks and genetic programming.**

PART C

V. Long answer type questions (Write the answers in 10-15 lines)

1. What are the applications of artificial intelligence?

Ans. Applications of AI is in many fields these are:

a) **Intrusion Detection System: It is a type of security software . It automatically alerts administration when someone is trying to violate the security system.**

   Example: firewall – It used to block unauthorized sites, email services against spam etc.

b) **Gaming: It plays important role in strategic games like chess, tic tac toe etc. Machine should be able to think of multiple steps. It uses Heuristic Knowledge.**

c) **Natural Language Processing: It communicates with the computers that understand human used natural language.**

d) **Machine Learning: It is an application of artificial intelligence. It provides systems the ability to automatically learn and improve from experience. It can collect and use data to learn them.**

e) **Expert System: These are applications which incorporate machine, programming and some data to confer thinking and prompting.**

f) **Vision System : They are able to understand, interpret and grasp visual input.**

g) **Speech recognition : These applications can understand language used by humans and talk to them.**

h) **Handwriting recognition: It is able to read text written by a pen or stylus on paper or screen.**

i) **Intelligent Robots: Can do multiple tasks in no time. They are adaptable to the environment around them. Tough cannot replace humans.**

2. What is the importance of AI ?

Ans 2. Areas of importance of AI are:

1. **Game Playing: It plays important role in strategic games such as chess, poker etc. In these games machine can think of many possible solutions. Example: Deep blue game of chess by IBM.**
2. **Voice Recognition: It is technique that transforms the words spoken by the user into text form. It is also called Speech Recognition. Example: Advertisement of google.**
3. **Understanding the Natural Language: Natural language is language that humans speak. Interaction process between human and computers is known as NLP. Its task is text translation. Grammatical analysis and speech recognitions. Example : Evernote for android, spell check, autocomplete etc.**
4. **Computer vision and analysis: Computer vision stands for 3D real world information into human understandable form. It helps in pattern recognition.**
5. **Self-Awareness: These machines are a concept of future and have not been developed yet. These machines which have properties like sentiments, self-awareness, super intelligent and consciousness.**

Q 3. What are pros and cons of artificial intelligence?

Ans. AI has many pros(advantages) and cons (disadvantages). These are as follows:

PROS OF ARTIFICIAL INTELLIGENCE	CONS OF ARTIFICIAL INTELLIGENCE
1. It is Cost Effective.: Robots and Machines do not have to get paid every month. 2. They don't take rest: Robots and Machines can perform lengthy and important tasks in effective manner. They don't need to rest, eat or sleep. 3. It Enhance Efficiency: AI Machines can perform most complex tasks without any error. 4. Low error rate: If coded properly, it has low error rate. 5. Work in hostile environment: AI Robots can complete dangerous tasks, explore in space and endure problems like mining and digging fuels. 6. Good Assistants: AI Machines can be good predictors for example in phone a application can predict what a user will type, ask, search and do. 7. Make repetitive task easier: Without getting bored like humans Ai machines can perform repetitive task in easy manner.	1. Machines cannot feel compassion and sympathy. 2. Increase in unemployment and job insecurity issues. Machine if replace Human resources, the rate at which people lose jobs will increase. 3. Risk of Loss of important data: Data stored on computers, smart phones etc. once lost cannot be retrieved. 4. The exploitation/ misuse of artificial intelligence: As seen in many Hollywood movies, high technology machines can destroy society.

8. **Machines don’t have emotions : Machine have no emotional barriers getting in the way of the workplace. Nothing effects their performance.**	

Q4 . Discuss the characteristics of expert system ?

Ans :Characteristics of expert system :

1. **Expertise: Expert system is expert in a particular area.**
2. **Quick Reaction Time: Expert system is quick in their response.**
3. **Flexible : These systems are flexible in handling questions**
4. **Reliability : It is more reliable because it does not make any mistake**
5. **Decision quality : These systems make the high quality decisions**
6. **Consistent: Expert system provides answers for the same questions.**
7. **Cost Effective : These system decreases the cost of consulting an expert for various domains**
8. **Successful forms of AI: Its truly successful forms of artificial intelligence software’s.**