

2022-2023



**केन्द्रीय विद्यालय संगठन, ऎर्नाकुलम क्षेत्र**  
**KENDRIYA VIDYALAYA SANGATHAN**  
**ERNAKULAM REGION**

# **Artificial Intelligence (417)**

CBSE Curriculum

**CLASS - IX**

**Student Support Material**



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**Artificial Intelligence (417)**

**CLASS IX**

**STUDENT SUPPORT MATERIAL**

**2022-2023**

आर सेन्टिल कुमार  
उपायुक्त

R. Senthil Kumar  
Deputy Commissioner



केन्द्रीय विद्यालय संगठन,  
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Dated: 11.08.2022

Message

I feel immense pleasure to publish the study material for class IX Artificial Intelligence. This support material is prepared incorporating all the recent changes in curriculum and assessment process made by CBSE. I am sure it will definitely be of great help to class IX students of all Kendriya Vidyalayas.

Introducing AI as a skill subject and training them appropriately will create the culture of innovation among students. It is important that the next generation upgrade themselves in this developing world and become problem solvers. The 2-day workshop for teachers teaching AI in Class IX and X was to enable them to train the students adequately to meet this purpose. This support material has been prepared as a post workshop activity by a team of dedicated Computer Science teachers and compiled by the resource persons of the workshop.

The Support material contains all the important aspects required by the students- the design of question paper, term wise split up syllabus, summary of all the chapters, MCQs, descriptive type and problem-solving questions. I hope that this Support Material will be used by students and teachers as well and will prove to be a good tool for quick revision.

I would like to express my sincere gratitude to the In-charge Principal and all the teachers who have relentlessly worked for the preparation of this study material. Their enormous contribution in making this project successful is praiseworthy.

Meticulous planning blended with hard work, effective time management and sincerity will help the students to reach the pinnacle of success.

Wish you all the best

  
(R. Senthil Kumar)

Mrs. Hema K  
Principal / Associate Course Director  
Kendriya Vidyalaya  
NTPC Kayamkulam

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*“Alone we can do so little ; together we can do so much “*

*– Helen Keller*

*Initiative and opportunity join hands and an endeavour begins. Encouragement becomes the corner stone to its success. Team Computer Science, KVS Ernakulam Region acknowledge the time and support given by each individual for bringing out this material.*

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# **CBSE | DEPARTMENT OF SKILL EDUCATION**

## **CURRICULUM FOR SESSION 2022-2023**

### **ARTIFICIAL INTELLIGENCE (SUB. CODE 417)**

CLASS – IX & X

#### **OBJECTIVES OF THE COURSE:**

The objective of this module/curriculum - which combines both Inspire and Acquire modules is to develop a readiness for understanding and appreciating Artificial Intelligence and its application in our lives. This module/curriculum focuses on:

1. Helping learners understand the world of Artificial Intelligence and its applications through games, activities and multi-sensorial learning to become AI-Ready.
2. Introducing the learners to three domains of AI in an age-appropriate manner.
3. Allowing the learners to construct meaning of AI through interactive participation and engaging hands-on activities.
4. Introducing the learners to AI Project Cycle.
5. Introducing the learners to programming skills - Basic python coding language.

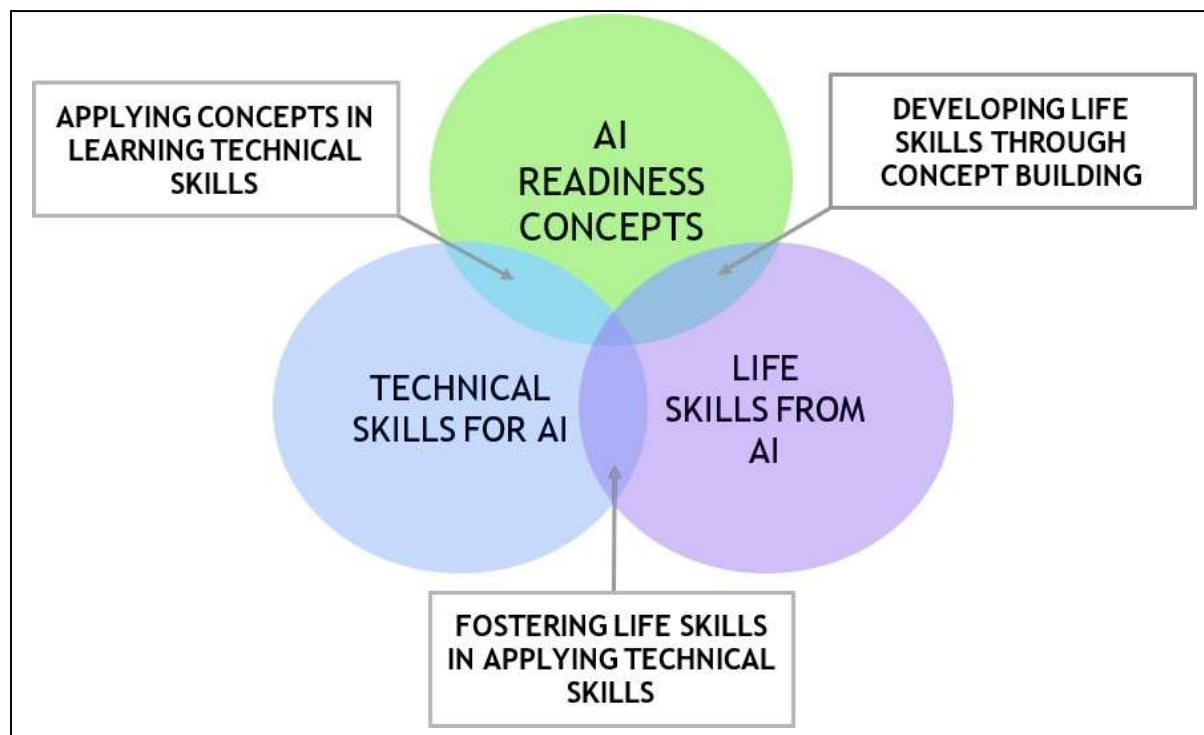
#### **LEARNING OUTCOMES:**

Learners will be able to

1. Identify and appreciate Artificial Intelligence and describe its applications in daily life.
2. Relate, apply and reflect on the Human-Machine Interactions to identify and interact with the three domains of AI: Data, Computer Vision and Natural Language Processing and Undergo assessment for analysing their progress towards acquired AI-Readiness skills.
3. Imagine, examine and reflect on the skills required for futuristic job opportunities.
4. Unleash their imagination towards smart homes and build an interactive story around it.
5. Understand the impact of Artificial Intelligence on Sustainable Development Goals to develop responsible citizenship.
6. Research and develop awareness of skills required for jobs of the future.
7. Gain awareness about AI bias and AI access and describe the potential ethical considerations of AI.
8. Develop effective communication and collaborative work skills.
9. Get familiar and motivated towards Artificial Intelligence and Identify the AI Project Cycle framework.
10. Learn problem scoping and ways to set goals for an AI project and understand the iterative nature of problem scoping in the AI project cycle.

11. Brainstorm on the ethical issues involved around the problem selected.
12. Foresee the kind of data required and the kind of analysis to be done, identify data requirements and find reliable sources to obtain relevant data.
13. Use various types of graphs to visualize acquired data.
14. Understand, create and implement the concept of Decision Trees.
15. Understand and visualize computer's ability to identify alphabets and handwritings.
16. Understand and appreciate the concept of Neural Network through gamification and learn basic programming skills through gamified platforms.
17. Acquire introductory Python programming skills in a very user-friendly format.

### **SKILLS TO BE DEVELOPED:**



### **SCHEME OF STUDIES:**

This course is a planned sequence of instructions consisting of units meant for developing employability and vocational competencies of students of Class IX opting for skill subject along with other education subjects.

The unit-wise distribution of hours and marks for class IX & X is as follows:

## **ARTIFICIAL INTELLIGENCE (SUBJECT CODE 417)**

**CLASS – IX (SESSION 2022-2023)**

**Total Marks: 100 (Theory-50 + Practical-50)**

	<b>UNITS</b>	<b>NO. OF HOURS for Theory and Practical</b>	<b>MAX. MARKS for Theory and Practical</b>
<b>PART A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills-I*	10	-
	Unit 2: Self-Management Skills-I	10	3
	Unit 3: ICT Skills-I	10	3
	Unit 4: Entrepreneurial Skills-I	15	4
	Unit 5: Green Skills-I*	05	-
<b>Total</b>		<b>50</b>	<b>10</b>
<b>PART B</b>	<b>Subject Specific Skills</b>		
	Unit 1: Introduction to Artificial Intelligence (AI)		10
	Unit 2: AI Project Cycle		15
	Unit 3: Neural Network		5
	Unit 4: Introduction to Python		10
<b>Total</b>			<b>40</b>
<b>PART C</b>	<b>Practical Work</b>		
	Unit 4: Introduction to Python <b>Practical File with minimum 15 Programs</b>		15
	<b>Practical Examination</b>		
	<ul style="list-style-type: none"> <li>• Simple programs using input and output function</li> <li>• Variables, Arithmetic Operators, Expressions, Data Types</li> <li>• Flow of control and conditions</li> <li>• Lists</li> </ul> <i>* Any 3 Programs based on the above topics</i>		15
	Viva Voce		5
	<b>Total</b>		<b>35</b>
<b>PART D</b>	<b>Project Work / Field Visit / Student Portfolio</b> <i>* relate it to Sustainable Development Goals</i>		15
	<b>Total</b>		<b>15</b>
	<b>GRAND TOTAL</b>	<b>200</b>	<b>100</b>

**Note:** \* marked units are to be assessed through Internal Assessment/ Student Activities.

**They are not to be assessed in Theory Exams**

## **DETAILED CURRICULUM/TOPICS FOR CLASS IX:**

### **PART-A: EMPLOYABILITY SKILLS**

<b>S. No.</b>	<b>Units</b>	<b>Duration in Hours</b>
1.	Unit 1: Communication Skills-I*	10
2.	Unit 2: Self-management Skills-I	10
3.	Unit 3: Information and Communication Technology Skills-I	10
4.	Unit 4: Entrepreneurial Skills-I	15
5.	Unit 5: Green Skills-I*	05
	<b>TOTAL</b>	<b>50</b>

**Note:** \* marked units are to be assessed through Internal Assessment/ Student Activities.

**They are not to be assessed in Theory Exams**

*The detailed curriculum/ topics to be covered under Part A: Employability Skills can be downloaded from CBSE website.*

### **PART-B – SUBJECT SPECIFIC SKILLS**

- ❖ Unit 1: Introduction to Artificial Intelligence (AI)
- ❖ Unit 2: AI Project Cycle
- ❖ Unit 3: Neural Network
- ❖ Unit 4: Introduction to Python

#### **UNIT 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE (AI)**

<b>SUB-UNIT</b>	<b>LEARNING OUTCOMES</b>	<b>SESSION / ACTIVITY / PRACTICAL</b>
<b>Excite</b>	To identify and appreciate Artificial Intelligence and describe its applications in daily life.	Session: Introduction to AI and setting up the context of the curriculum Ice Breaker Activity: Dream Smart Home idea • Learners to design a rough layout of floor plan of their dream smart home.
	To relate, apply and reflect on the Human-Machine Interactions. To identify and interact with the three domains of AI: Data, Computer Vision and Natural Language Processing.	Recommended Activity: The AI Game • Learners to participate in three games based on different AI domains. – Game 1: Rock, Paper and Scissors (based on data) – Game 2: Mystery Animal (based on Natural Language Processing - NLP) – Game 3: Emoji Scavenger Hunt (based on Computer Vision - CV)
	To undergo an assessment for analysing progress towards acquired AI-Readiness skills.	Recommended Activity: • AI Quiz (Paper Pen/Online Quiz)

<b>SUB-UNIT</b>	<b>LEARNING OUTCOMES</b>	<b>SESSION / ACTIVITY / PRACTICAL</b>
	To imagine, examine and reflect on the skills required for futuristic job opportunities.	<p>Recommended Activity: To write a letter. Writing a Letter to one's future self</p> <ul style="list-style-type: none"> <li>Learners to write a letter to self-keeping the future in context. They will describe what they have learnt so far or what they would like to learn someday</li> </ul>
<b>Relate</b>	Learners to relate to application of Artificial Intelligence in their daily lives.	<p>Video Session: To watch a video</p> <ul style="list-style-type: none"> <li>Introducing the concept of Smart Cities, Smart Schools and Smart Homes</li> </ul>
	To unleash their imagination towards smart homes and build an interactive story around it. To relate, apply and reflect on the Human-Machine Interactions.	<p>Recommended Activity: Write an Interactive Story</p> <ul style="list-style-type: none"> <li>Learners to draw a floor plan of a Home/School/City and write an interactive story around it using Story Speaker extension in Google docs.</li> </ul>
<b>Purpose</b>	To understand the impact of Artificial Intelligence on Sustainable Development Goals to develop responsible citizenship.	<p>Session:</p> <ul style="list-style-type: none"> <li>Introduction to UN Sustainable Development Goals</li> </ul> <p>Recommended Activity: Go Goals Board Game</p> <ul style="list-style-type: none"> <li>Learners to answer questions on Sustainable Development Goals</li> </ul>
<b>Possibilities</b>	<p>To research and develop awareness of skills required for jobs of the future.</p> <p>To imagine, examine and reflect on the skills required for the futuristic opportunities.</p> <p>To develop effective communication and collaborative work skills.</p>	<p>Session: Theme-based research and Case Studies</p> <ul style="list-style-type: none"> <li>Learners will listen to various case-studies of inspiring start-ups, companies or communities where AI has been involved in real-life.</li> <li>Learners will be allotted a theme around which they need to search for present AI trends and have to visualise the future of AI in and around their respective theme.</li> </ul> <p>Recommended Activity: Job Ad Creating activity</p> <ul style="list-style-type: none"> <li>Learners to create a job advertisement for a firm describing the nature of job available and the skill set required for it 10 years down the line. They need to figure out how AI is going to transform the nature of jobs and create the Ad accordingly.</li> </ul>
<b>AI Ethics</b>	To understand and reflect on the ethical issues around AI.	<p>Video Session: Discussing about AI Ethics</p> <p>Recommended Activity: Ethics Awareness</p> <ul style="list-style-type: none"> <li>Students play the role of major stakeholders, and they have to decide what is ethical and what is not for a given scenario.</li> </ul>
	To gain awareness around AI bias and AI access.	<p>Session: AI Bias and AI Access</p> <ul style="list-style-type: none"> <li>Discussing about the possible bias in data collection</li> <li>Discussing about the implications of AI technology</li> </ul>

SUB-UNIT	LEARNING OUTCOMES	SESSION / ACTIVITY / PRACTICAL
	To let the students analyse the advantages and disadvantages of Artificial Intelligence.	<p>Recommended Activity: Balloon Debate</p> <ul style="list-style-type: none"> <li>Students divide in teams of 3 and 2 teams are given same theme. One team goes in affirmation to AI for their section while the other one goes against it.</li> <li>They have to come up with their points as to why AI is beneficial/ harmful for the society.</li> </ul>

## UNIT 2: AI PROJECT CYCLE:

SUB-UNIT	LEARNING OUTCOMES	SESSION / ACTIVITY / PRACTICAL
Problem Scoping	Identify the AI Project Cycle framework.	<p>Session: Introduction to AI Project Cycle</p> <ul style="list-style-type: none"> <li>Problem Scoping</li> <li>Data Acquisition</li> <li>Data Exploration</li> <li>Modelling</li> <li>Evaluation</li> </ul>
	Learn problem scoping and ways to set goals for an AI project.	<p>Activity: Brainstorm around the theme provided and set a goal for the AI project.</p> <ul style="list-style-type: none"> <li>Discuss various topics within the given theme and select one.</li> <li>List down/ Draw a mind map of problems related to the selected topic and choose one problem to be the goal for the project.</li> </ul>
	Identify stakeholders involved in the problem scoped. Brainstorm on the ethical issues involved around the problem selected.	<p>Activity: To set actions around the goal.</p> <ul style="list-style-type: none"> <li>List down the stakeholders involved in the problem.</li> <li>Search on the current actions taken to solve this problem.</li> <li>Think around the ethics involved in the goal of your project.</li> </ul>
	Understand the iterative nature of problem scoping for in the AI project cycle. Foresee the kind of data required and the kind of analysis to be done.	<p>Activity: Data and Analysis</p> <ul style="list-style-type: none"> <li>What are the data features needed?</li> <li>Where can you get the data?</li> <li>How frequent do you have to collect the data?</li> <li>What happens if you don't have enough data?</li> <li>What kind of analysis needs to be done?</li> <li>How will it be validated?</li> <li>How does the analysis inform the action?</li> </ul>
	Share what the students have discussed so far.	Presentation: Presenting the goal, actions and data.

SUB-UNIT	LEARNING OUTCOMES	SESSION / ACTIVITY / PRACTICAL
<b>Data Acquisition</b>	Identify data requirements and find reliable sources to obtain relevant data.	Activity: Introduction to data and its types. <ul style="list-style-type: none"> <li>Students work around the scenarios given to them and think of ways to acquire data.</li> </ul>
<b>Data Exploration</b>	To understand the purpose of Data Visualisation	Session: Data Visualisation <ul style="list-style-type: none"> <li>Need of visualising data</li> <li>Ways to visualise data using various types of graphical tools.</li> </ul>
	Use various types of graphs to visualise acquired data.	Recommended Activity: Let's use Graphical Tools <ul style="list-style-type: none"> <li>To decide what kind of data is required for a given scenario and acquire the same.</li> <li>To select an appropriate graphical format to represent the data acquired.</li> <li>Presenting the graph sketched.</li> </ul>
<b>Modelling</b>	Understand, create and implement the concept of Decision Trees.	Session: Decision Tree <ul style="list-style-type: none"> <li>To introduce basic structure of Decision Trees to students.</li> </ul>
		Recommended Activity: Decision Tree <ul style="list-style-type: none"> <li>To design a Decision Tree based on the data given.</li> </ul>
	Understand and visualise computer's ability to identify alphabets and handwritings.	Recommended Activity: Pixel It <ul style="list-style-type: none"> <li>To create an "AI Model" to classify handwritten letters.</li> <li>Students develop a model to classify handwritten letters by diving the alphabets into pixels.</li> <li>Pixels are then joined together to analyse a pattern amongst same alphabets and to differentiate the different ones.</li> </ul>

**UNIT 3: NEURAL NETWORK:**

LEARNING OUTCOMES	SESSION / ACTIVITY / PRACTICAL
Understand and appreciate the concept of Neural Network through gamification.	Session: Introduction to neural network <ul style="list-style-type: none"> <li>Relation between the neural network and nervous system in human body</li> <li>Describing the function of neural network.</li> </ul>

## UNIT 4: INTRODUCTION TO PYTHON:

LEARNING OUTCOMES	SESSION / ACTIVITY / PRACTICAL
Learn basic programming skills through gamified platforms.	Recommended Activity: <ul style="list-style-type: none"><li>Introduction to programming using Online Gaming portals likeCode Combat.</li></ul>
Acquire introductory Python programming skills in a very user-friendly format.	Session: <ul style="list-style-type: none"><li>Introduction to Python language</li><li>Introducing python programming and its applications</li></ul> Theory + Practical: Python Basics <ul style="list-style-type: none"><li>Students go through lessons on Python Basics (Variables, Arithmetic Operators, Expressions, Data Types -integer, float, strings, using print() and input() functions)</li><li>Students will try some simple problem-solving exercises onPython Compiler.</li></ul>
	Practical: Flow of control and conditions <ul style="list-style-type: none"><li>Students go through lessons on conditional and iterative statements (if, for and while)</li><li>Students will try some basic problem-solving exercises using conditional and iterative statements on Python Compiler.</li></ul>
	Practical: Python Lists <ul style="list-style-type: none"><li>Students go through lessons on Python Lists (Simpleoperations using list)</li><li>Students will try some basic problem-solving exercises using lists on Python Compiler.</li></ul>

# PART A

# Employability Skills

## UNIT 1 - COMMUNICATION SKILL

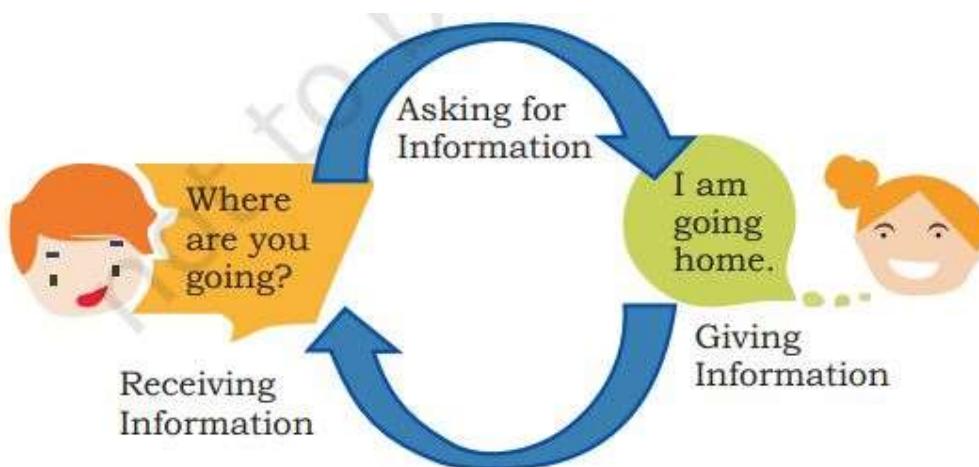
### NOTES

#### Communication

Communication skills are those skills which are needed to speak and write properly.

#### Meaning of communication

The word 'Communication' comes from the Latin word *commūnicāre*, meaning 'to share'. In Figure, you can see that communication is the 'sharing' of information between two or more individuals or within a group to reach a common understanding.



Communication is the process of exchanging or passing of information, ideas or thoughts from one person to the other in a meaningful way.

#### Importance of Communication skill

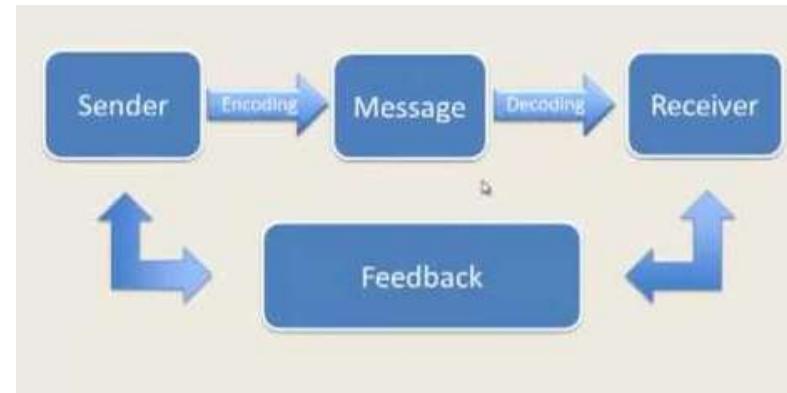
Importance of communication Your ability to communicate clearly and share thoughts, feelings and ideas will help you in all your relationships. For example, you can inform about something or you can also influence others through communication.

Communication skills are needed to:

- **Inform:** You may be required to give facts or information to someone. For example, communicating the timetable of an exam to a friend.
- **Influence:** You may be required to influence or change someone in an indirect but usually important way. For example, negotiating with a shopkeeper to reduce the price or helping a friend to overcome stress due to exam or any other reason.
- **Express feelings:** Talking about your feelings is a healthy way to express them. For example, sharing your excitement about doing well in your exams or sharing your feelings with your parents and friends.

### **Elements of Communication cycle**

Communication is a two-way exchange of information, i.e., giving and receiving (Fig.). Speaking and writing to someone are examples of giving information. Reading and listening to someone are examples of receiving information.



1. **A Sender:** The one who initiates the communication
2. **Message:** The idea that is being conveyed
3. **Encoding:** Converting message into the form suitable for the required medium
4. **Communication channel:** Medium through which communication take place
5. **A receiver :** The target audience for the message
6. **Decoding:** Converting received message in a form understandable by receiver
7. **Feedback:** Response to convey if the message is successfully received or not.

### **Factors affecting Communication:**

There are many factors that affect communication. These factors are also called barriers of communication.

1. **Physical/Environmental barrier:** Anything that prevent you from receiving or understanding the messages like noise, climate, medium, visual perception etc
2. **Language barriers:** Difficulty in speaking with people who speak a different language.
3. **Cultural barrier:** When different cultures prevent you from communicating effectively. For example people with different beliefs, different cultural meanings etc
4. **Gender barrier:** When men and women cannot communicate because of difference in ideas, attitudes and values.
5. **Emotional barrier:** Mental walls that prevent people from openly communicating their thoughts and feelings to others.

## Effective communication

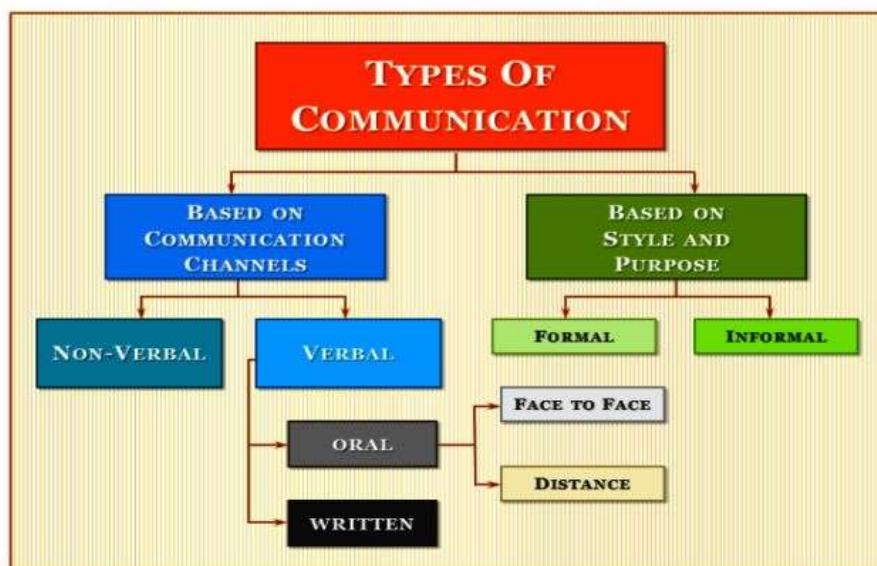
Effective communication can happen if we follow the basic principles of professional communication skills. These can be abbreviated as 7 Cs, i.e., Clear, Concise, Concrete, Correct, Coherent, Complete and Courteous. These are further explained in Figure.

Clear	Concise	Concrete	Correct	Coherent	Complete	Courteous
Be clear about what you want to say	Use simple words and say only what is needed	Use exact words and phrases	Use correct spellings, language and grammar	Your words should make sense and should be related to the main topic	Your message should have all the needed information	Be respectful, friendly and honest

## Types of communication

Communication can take place in many ways:

- i) Verbal Communication-communicating orally
- ii) Non Verbal Communication-communicating using body language, gestures or tone
- iii) Written form- communicating via handwritten or printed information
- iv) Visual form-communicating via pictures, logos, posters, maps or charts etc.



## **Verbal Communication**

Verbal communication is the sharing of information by using words. It is what most people use as a method of communication.

Verbal communication can be divided into two categories.

a. **Oral or Spoken communication** – Oral Communication involves Face-to-face communication, Teaching in classroom or talking on the phone is an example of oral or spoken communication.

b. **Written Communication** – Written Communication involves written or typed words. Banners, Articles, Notes, Writing letters, email, and Short Messaging Services are examples of written communication.

## **Components of Verbal Communication**

1. Clarity of speech of sender
2. Listening skills of receiver
3. Fluent language of sender
4. Comprehension ability of receiver

## **Types of Verbal Communication**

1. Intrapersonal communication : Silent conversations
2. Interpersonal communication : Conversation between two individuals
3. Small group communication : Conversation between more than two people
4. Public communication : One individual addressing large gathering of people

## **Advantages and Disadvantages of Verbal Communication**

### **Advantages:**

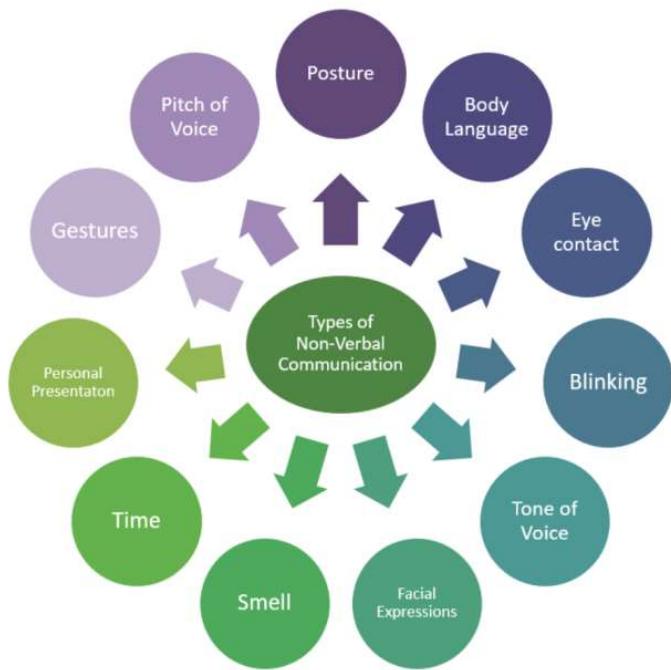
1. We can Convery our messages easily and quickly
2. We get response from audience quickly
3. We can securely exchange ideas
4. We can update our speech according to the response from audience
5. We can communicate cheaply

### **Disadvantages**

1. The language and cultural difference of the speaker
2. It has no legal validity
3. If we use confusing and complicated words , the receiver may not understand.

## Non Verbal Communication

Non-verbal communication is the message we send to others without using any words. We send signals and messages to others, through expressions, gestures and body postures.



### Types of Non Verbal Communication:

Facial Expression:	Facial expressions are responsible for a huge proportion of nonverbal communication. Consider how much information can be conveyed with a smile or a frown.
Gestures:	Deliberate movements and signals are an important way to communicate meaning without words. Common gestures include waving, pointing, and using fingers to indicate numeric amounts.
Paralinguistics :	Paralinguistics refers to vocal communication that is separate from actual language. This includes actors such as tone of voice, loudness, inflection, and pitch.
Body language and Postures:	Posture and movement can also convey a great deal of information. arm-crossing, and leg-crossing etc are interpreted in different ways
Eye Contact	The eyes play an important role in nonverbal communication and such things as looking, staring and blinking

## **Advantages and Disadvantages of Non Verbal Communication**

### **Advantages:**

1. Non Verbal clues are easy to give
1. Time is not wasted
2. Even illiterate people can pick up
3. No language barrier

### **Disadvantages:**

1. Long and detailed message cannot be communicated
2. It may be difficult for some people to understand

## **Visual communication**

Another important method of communication is visual communication, which involves sending and understanding messages only through images or pictures. The main advantage of this type of communication is that you do not need to know any particular language for understanding it. It is simple, easy to understand and remains same across different places.

### Advantages of Visual communication:

1. It is immediate
2. It is simple and easy to remember
3. It is universal

### Disadvantages of Visual communication:

1. It cannot handle complex data
2. It may vary according to different culture

## **Written communication**

Communicating through written words is called written communication. It is a more formal way of communication and is used for documentation process.

### Advantages of written communication:

1. It is a permanent means of communication
2. Written communication is more precise and explicit
3. It provides ready record and references

### Disadvantages of written communication:

1. Written communication is comparatively costly
2. Instant clarification is not possible
3. It is time consuming

## Writing Skills: English Language

A sentence is a group of words that communicates a complete thought (Example: Raju goes to school). A group of words, which does not make complete sense, is known as a phrase (Example: Raju goes). A sentence always begins with a capital letter, and it always ends with a question mark, full stop or exclamation mark.

### Using capitals

<b>Alphabet</b>	<b>M</b>	<b>I</b>	<b>N</b>	<b>T</b>	<b>S</b>
What it shows:	Months	The letter	Names	Titles	Starting letter of sentences
Rule	Capitalise the first letter in all the names of months.	Capitalise the letter 'I' when it is used to begin a word.	Capitalise the first letter in the names of people, places and days.	Capitalise the first letter in the titles used before people's name.	Capitalise the first letter in every sentence.
Example	I will go to college in June.	I play tennis with him every day.	This Tuesday, Vidya will be in Rajasthan.	Dr Shah and Mr Patel work together.	The cat ran out of the house.

### Punctuation

It is a set of marks, such as the full stop and the comma, which help us separate parts of a sentence and explain its meaning.

### Basic parts of speech

There are eight basic parts of speech in the English language. These are noun, pronoun, verb, adjective, adverb, preposition, conjunction and interjection. The part of speech indicates how the word functions in meaning as well as grammatically within the sentence.



#### **Noun**

A noun is the name of a person, place, thing, or idea.

*man... Butte College... house... happiness*

## Pronoun

A pronoun is a word used in place of a noun.

*She... we... they... it*

## Verb

A verb expresses action or being.

*jump... is... write... become*

## Adjective

An adjective modifies or describes a noun or pronoun.

*pretty... old... blue... smart*

## Adverb

An adverb modifies or describes a verb, an adjective, or another adverb.

*gently... extremely... carefully... well*

## Preposition

A preposition is a word placed before a noun or pronoun to form a phrase modifying another word in the sentence.

*by... with.... about... until*

## Conjunction

A conjunction joins words, phrases, or clauses.

*and... but... or... while... because*

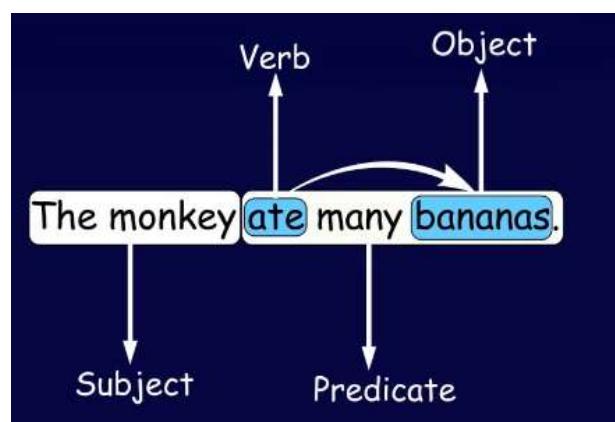
## Interjection

An interjection is a word used to express emotion.

*Oh!... Wow!... Oops!*

## Parts of a sentence

As you have learnt in English classes, almost all English sentences have a subject and a verb. Some also have an object. A subject is the person or thing that does an action. A verb describes the action. Object is the person or thing that receives the action.



## **Activities**

### **Activity 1**

#### **Role play of a phone conversation**

- Form groups comprising at least three students in each group.
- Write a script on a phone conversation, based on a scenario given by your teacher.
- One student acts as a caller and the other as receiver.
- Speak the conversation aloud.
- The third student gives feedback on the effectiveness of the communication, keeping in mind the 7Cs of communication.

### **Activity 2**

#### **Public speaking**

- Form groups of three students in each group.
- Within the group, choose a topic for a very short speech.
- Each person uses the 3Ps (Prepare, Practice and Perform) method and makes a speech to the others in the group.
- Others give feedback—was the person able to communicate properly?
- One student volunteers to give a speech in front of the class.

### **Activity- 3**

#### **Passing a message/ Dump charades**

- Activity is for the entire group
- Pass a secret message through the students row wise and listen to the message received by the last student to check the listening skill of the students.
- Give a word related to the subject for students to enact using gestures

## **QUESTION AND ANSWERS**

### **Q1. What is Communication?**

Answer – The act of giving, receiving, and sharing information is known as communication. Signs and signals provide information. Communication can take the form of speaking, writing, or any other medium.

The word ‘Communication’ comes from the Latin word communicare, which means ‘to share’.

### **Q2. What is the importance of communication?**

Answer – Communication helps to improve physical, social and good relationships between family and friends.

There are three importance of communication in day to day life –

- a. Inform – We give facts or information to someone in daily life.
- b. Influence – Sometimes we are required to influence or change someone in an indirect but usually important way.
- c. Express feelings – if you are expressing your views or feelings to others is a healthy way to express them.

### **Q3. What are the elements of communication?**

Answer – Communication means giving and receiving, which is a two-way exchange of information. Giving information is an example of speaking and writing, whereas receiving information is an example of reading and listening. Sender, Receiver, Message, Encoding, Decoding, Channel, Feedback etc are the elements of communication.

### **Q4. What are the seven elements that influence the communication skills?**

Answer – There are seven different factors which affect Perspectives in communication –

- Language
- Environment
- Visual Perception
- Culture
- Prejudice
- Feelings
- Past Experience

### **Q5. How many types of Communication methods?**

Answer – There are main three types of communication methods –

- a. Verbal communication
- b. Non-verbal communication
- c. Visual communication
- d. Written communication

### **Q6 What is verbal communication? Advantages and disadvantages of verbal communication.**

Answer – Communication is a two-way method for exchanging information, thoughts, ideas, and feelings. In verbal communication we can share ideas or thoughts in the form of sound and word, it is also known as face – to – face communication.

### **Advantages:**

1. We can convey our messages easily and quickly
2. We get response from audience quickly
3. We can securely exchange ideas
4. We can update our speech according to the response from audience
5. We can communicate cheaply

### **Q7 Write down the different types of verbal communication. Give an example for each type.**

Answer – Verbal communication can be divided into two categories.

- a. **Oral or Spoken communication** – Oral Communication involves Face-to-face communication, Teaching in classroom or talking on the phone is an example of oral or spoken communication.
- b. **Written Communication** – Written Communication involves written or typed words. Banners, Articles, Notes, Writing letters, email, and Short Messaging Services are examples of written communication

### **Q8 What is non-verbal communication?**

Answer – Without using word if you are sending some information to others is known as non- verbal communication, Some of the non – verbal communication is –

- Eye contact
- Gestures
- Expressions
- Posture
- Space
- Para Language
- Touch

### **Q9 What role does non-verbal communication play?**

Answer – In our daily life it is observed that most of the communication is done using body movements and voice control.

Importance of non-verbal communication

- a. In the non-verbal communication you can make your message stronger as compared to written communication.
- b. Helps overcome cultural barriers.
- c. With the right gestures while speaking makes our message more effective
- d. Using the right gestures and postures helps us to be professional at work.
- e. The message is delivered and communicated more effectively than verbal communication.
- f. In the time of public speech you can understand the audience's reaction easily and adjust our behavior or communication accordingly.

### **Q10 What is visual communication?**

Answer – In daily life we are using visual communication. Sometimes we are getting messages from images or pictures. The main advantage of visual communication is that you do not need to know any particular language.

#### **Example of visual communication**

- a. Sign for ladies and gents toilet
- b. Traffic symbol
- c. Sign for flammable substance

### **Q11 What are the basic parts of speech in the English Language?**

Answer – There are eight basic parts of speech in the English language. These are none, pronoun, verb, adjective, adverb, preposition, conjunction and interjection.

- a. **Noun** – Nouns is the name of a person, place, animal or thing. This is also called ‘naming words’.
- b. **Pronoun** – A pronoun is used in place of a noun.
- c. **Adjectives** – Adjectives are words that describe other words.
- d. **Verbs** – Verbs are words that show action.
- e. **Adverbs** – Adverbs are words that add meaning to verbs, adjectives, or other adverbs.
- f. **Preposition** – A preposition is a word placed before a noun or pronoun.
- g. **Conjunction** – A conjunction is a word that connects two words, phrases, or clauses.
- h. **Interjection** – A word used to communicate emotion is called an interjection.

### **Q12 What are the various parts of the Sentence?**

Answer -A subject and a verb make up a sentence. There is an object in some of the sentences. The subject is generally a noun, which is a term that refers to a person or thing who performs a specific activity.

The verb comes after the subject and indicates that something is being done. An object, which usually comes after the verb, receives the action.

**There are three different types of parts of sentences –**

- Subject
- Verb
- Object

### **Very Short Answer Questions (carries 1 mark each)**

1. What is the purpose of communication?

Communication serves five major purposes: to inform, to express feelings, to imagine, to influence, and to meet social expectations.

2. What do you understand by communication?

Communication is a process that involves sending and receiving messages through the verbal and non-verbal methods.

3. Write down the seven factors affecting perspectives in communication.

Language, Visual perception, past experience, prejudice, feelings, Environment, Personal factors and Culture are the seven factors affecting perspectives in communication.

### **Short Answer Questions (carries 2 marks each)**

4. What are the elements of communication?

Sender, Ideas, encoding, communication channel, receiver, decoding and feedback are the elements of communication.

5. Write any two advantages of verbal communication.

**Advantages of Verbal Communication:**

- It saves time in communication.
- It is quick in obtaining feedback once delivered.

- It provides complete understanding of communication delivered and there is chance to make it more clear in case of doubts in interpretation of words or ideas.
  - It is more reliable method of communication.
  - It is flexible and effective for all.
  - It is powerful means of persuasion and control.
  - It is cheaper way of communication and hence saves money.
6. How is visual communication helpful? Explain with a few advantages.  
Visual communication results in **better retention of the information**.  
From a scientific perspective, it's been found that using relevant visuals help the audience remember the information more effectively.
- Advantages of Visual Communication:**
- It brings immediate attention to the viewers and provide backing to information shared during demonstration.
  - It clarifies meaning to our oral or written discussion by visual means.
  - Visual information immediately registers in the brain of human being.
  - It allows gain and regain of attention of the audience.
  - It adds variety to written or oral presentation as listening to same voice or reading long pages of text can be very boring.
7. What are barriers in communication? How is psychological barrier different from emotional barrier?  
Communication barriers are something that prevents us from correctly getting and accepting the messages others use to communicate their information, thoughts and ideas.
- Physical barriers.
  - Perceptual barriers.
  - Emotional barriers.
  - Cultural barriers.
  - Language barriers.
  - Gender barriers.
  - Interpersonal barriers
- The psychological barrier of communication is the influence of psychological state of the communicators (sender and receiver) which creates an obstacle for effective communication. Communication is highly influenced by the mental condition that the communicators are in and is disturbed by mental disturbance.
- An emotional barrier is a mental block that influences how you perceive others' actions and prevents you from clearly communicating your feelings.
8. Name 7 C's of communication.  
The seven C's are: **clarity, correctness, conciseness, courtesy, concreteness, consideration and completeness.**
9. What do you mean by body language? What are Do's and Don'ts.

Body language is the use of physical behavior, expressions, and mannerisms to communicate nonverbally, often done instinctively rather than consciously.

Don't stare at anyone, keep your eyes moving. Don't flap your arms. If you don't know what to do with your arms and hands, keep them at your side. Don't only look at your notes and fail to raise your head to look at your audience.

#### 10. What is the importance of feedback? How can we give a feedback?

The following are some of the importance of feedback in communication:-

- It completes the whole process of communication and makes it continuous.
- It sustains communication process.
- It makes one know if one is really communicating or making sense.
- It is a basis for measuring the effectiveness of communication.
- It is a good basis for planning on what next to be done especially statistical report.
- Communication will be useless without feedback.
- Feedback paves way for new idea generation.
- It is a process of effective listening.
- It serves as basis of problem-solving.
- Can motivate.
- It can improve performance.

## **UNIT 2 - SELF MANAGEMENT SKILLS**

### **NOTES**

#### **Self Management Skills**

Ability to regulate and control your actions, feelings, and thoughts is referred to as self-management skills. It also helps to improve personal and academic goals.

#### **Self-management can also helps in the following areas:-**

- Reaching your goals
- Developing good habits
- Overcoming challenges and difficulties
- Overcoming bad habits

#### **Positive Results of Self-Management**

- It guides individuals to self-monitor their conduct and behavior

Students, once become aware that they are responsible for their behavior, they become proactive

- It helps in self-evaluation

Self-management makes individuals realize that they need to do course correction by themselves if they do not get desired goals. Once the goals are achieved as desired, it also motivates individuals.

It also motivates individuals:

- Helps in setting individual goals
- Directs evaluation of performance
- objective resetting
- enhances self-esteem

- It leads to self – reinforcement of positive behavior

Self-management reinforces appropriate behavior of students as per the time, situation and people involved.

#### **Self Management Skills**

- **Self – awareness** – Ability to control your values, likes, strengths, dislikes and weaknesses, etc.

- **Self control** – Holding the ability to control your behavior, discipline, and so on.

- **Self – confidence** – Believe in yourself and don't be scared to take risks.

- **Problem solving** – Understanding a problem and finding the solution.

- **Self motivation** – Try to complete your tasks without any external help.

- **Personal hygiene** – Be healthy, clean and smart

- **Positive thinking** – Expressing certainty or affirmation even in tough situations

- **Teamwork** – Work in team to complete the goals

- **Time management** – According to your plan, achieve the task on time.

- **Goal setting** – Plan and accomplish the goals within a timeframe.

-

## **Strengths and weaknesses**

### **Strengths**

- Think that you are always good at
- Think about what you do well
- Think about what others appreciate about you

### **Weaknesses**

- Identify the areas where you struggle and what you find difficult to do
- Accept the feedback you receive from others
- Be positive with feedback and try to improve yourself.

## **Stress**

Stress is our body and mind's response and reaction to challenging or taxing situations in our lives. It is our body's way of reacting and getting prepared to deal with a situation and the pressure it creates.

There are 2 types of stress:

Good stress and Bad stress.

Good stress is also called eustress. It refers to the limited quantity of stress that helps one keep focused and motivated to do something. It lasts only for a short time.

Bad stress is ongoing and does not lower down. It is also known as distress. It is the negative form of stress and hinders your progress. It even affects the body's immune system.

### **Stress management techniques:**

1. Physical Exercise
2. Healthy diet and life style
3. Yoga
4. Meditation
5. Taking breaks
6. Positive thinking
7. Organizing life
8. Holidaying
- 9.

## **Emotional Intelligence**

It refers to the ability to monitor and understand own and others feeling and emotion and take appropriate actions

### **Steps to develop Emotional Intelligence:**

- Perceive emotions
- Facilitate thoughts
- Understand emotions
- Manage emotions

## **Self Motivation**

Self motivation is the ability to do things on your own without being told to do so. It is a fire within us that lights our path and drives us to do and achieve something. Self motivation is the best motivation.

### **Types of motivation:**

1. External motivation- If an external factor like reward is responsible for motivation, it is external motivation. Examples: Incentives, promotion, punishment, criticism etc
2. Internal motivation- If an internal factor like peace of mind is responsible for motivation, it is called internal motivation. Examples : Love, joy, belongingness, fear etc

### **The traits of self motivated people:**

1. Belief – They believe in their ability to achieve goals. They are self aware. They know their strengths and weakness
2. Grounded and focused – They stay real , without arrogance, ego or excuses. They never loose focus
3. Keen learners – They are prepared to acquire knowledge, skill or resources necessary to achieve their goals
4. Consistent Action – They take action dedicatedly
5. Manage emotions well- They are positive thinkers

### **Goal Setting**

Goal refers to an objective that you wish to achieve within some specific time. Goal setting refers to the process of planning and taking active steps to achieve a specific goal.

### **SMART Goals**

To set effective goals , the goals must be SMART

**S (Specific)** – Goals should clearly specify what is to be achieved. To set a specific goal it should answer the six “W” questions:

Who, What, Where, When, Which, Why

**M (Measurable)** – Goals should have a concrete criteria for measuring progress. It may answer questions like How much, How many, How will I know when it is accomplished etc

**A(Attainable)-** Goals should be attainable and achievable. A gig task may be divided into sub tasks so that it is attainable

**R(Realistic)** – A goal must represent an objective towards which you are both willing and able to work

**T(Time bound)** – A goal must be grounded within a time frame.

### **Time Management**

Time is an asset and time management is a skill that lets you use this asset in a best possible way. Time management refers to the planning out of available time and controlling the amount of time to be spent on specific tasks in order to work more efficiently.

Significance of Time management:

1. It improves performance
2. It delivers better work quality
3. Timely delivery
4. Brings more efficiency
5. Reduces stress

### **Steps for effective time management**

Effective time management requires a style of work where you allocate time for different subtasks, get things done as per priority and importance and keep a track of it. Effective time management can be summarized in the form of 4 steps:

1. Organize- Planning out your time in advance is called organizing time. Prepare a list of things to do. Find out the activities you have to start first so that it gets over within the time frame.
2. Prioritize – Looking at the list of task prepared in step 1, determine which task is the most urgent one. Leave less important tasks to be completed later. Rewrite the list as per the priority.
3. Control – This step is about controlling and monitoring how the tasks are carried out as per the schedule without wasting time.
4. Track time – For efficiency it is important to track the time. We may use different tracking tools like time tables, diary, to-do lists etc

### **Time management tips:**

1. Stick to the schedule, avoid delay and procrastination
2. Start with urgent and important task first always
3. Do one thing at a time, resist diversions, don't muti task
4. Plan for the unexpected
5. Learn to say "No"
6. Delegate activities wherever possible

### **Self Confidence**

It is the ability to have trust on one's abilities and skills.

### **Factors that help in building self-confidence**

1. Social:  
Interactions with family and social environment, like friends, relatives, teachers and media influences self-confidence of individuals. Development of confidence on self is a process which results from the experiences of individuals while interacting with others.
2. Cultural:  
Cultural factors comprise of values, beliefs and customs. Indians give higher importance to family values, believe in the philosophy of "Vasudheva Kutumbhakam" and follow custom of celebrating Diwali. Conforming to cultural values, beliefs and customs enhances selfconfidence.
3. Physical  
Physical self-efficacy, physical activity and social physique anxiety are found to be influencing self-confidence of individuals. Physical activity is found to be directly related to self-confidence. Physical self-efficacy refers to physical potential to complete a given task. Social physique anxiety is a concern amongst individuals about perceived evaluation of one's physical self by the society.

### **Self-Confidence Building Tips**

Mind is like a fertile land, if you do not plant good thoughts there, weeds are bound to grow.

1. Getting rid of negative thoughts: Going away from negative thoughts takes individuals closer to a peaceful positive mind. To travel away from negative thoughts, individuals need to involve themselves in an activity – take a walk, draw, sing, dance, chat, watch, read or talk.
2. Thinking positively: Positive thinking brings brain to a peaceful stance and increases productivity and performance. When individuals start thinking positively, they feel happy from within and their self-confidence boosts up.
3. Staying happy with small things: An individual who is full of gratitude for every small blessing in his life feels contented. Being thankful towards people and the world, instills confidence in individuals.
4. Staying clean, hygienic and smart : Personal hygiene is the first key to a confident person. Keeping hair, teeth, fingers, body and skin clean and well maintained is an easy and effective way to be at best.
5. Chatting with positive people: Interacting with positive people brings forth a fresh and progressive perspective to life. People in similar stages of life go through similar issues. Some positively handle these situations, and interacting with them shall help boost confidence.

## **Activities**

### **Activity 1**

#### **Aim in life**

- Form pairs of students. Make a list of tasks/activities you can do well.
- Write your main aim in life.
- List down short term and long term goals and check whether they are SMART

### **Activity 2**

#### **Self Management Skills**

- Form pairs of students
- Make a table of self management skills and ask each one of them to grade themselves
- Also grade the other person
- Compare the grades

### **Activity 3**

#### **Interests and abilities**

Each student has to complete two worksheets, each containing a list of statements. First worksheet is for interests and the second is for abilities. Each student has to be real and honest when marking the statements in the two worksheets if he/she is not real and honest, they will get incorrect results about their own interests and abilities.

### **Activity 4**

#### **Self management skills**

Read the following paragraph. Write in class. One volunteer can read what he/she wrote and other students can discuss.

Manish got admission to a new school. His cloths were not clean , shoes were not polished and laces not tied. He did not smile at anyone and looked sad. He did not look confident. What are the qualities of self management that you think are missing in Manish?

### **QUESTION AND ANSWERS**

#### Multiple Choice Questions: ( 1 mark )

**Q1. Stress is identified as a condition in which a person is .....**

- A) tensed
- B) worried
- C) relaxed
- D) both (A) and (B)

**Answer (D)**

**Q2. What plays a major role in reaction to stress**

- A) Emotions
- B) Personality
- C) Confidence
- D) None of these

**Answer (B)**

**Q3. The feeling of self-awareness enhances our.....**

- A) Self-confidence
- B) Self-monitoring
- C) Self-Regulation
- D) All of the above

**Answer (A)**

**Q4. The internal stress caused by .....**

- A) pent-up worries
- B) laziness
- C) survival stress
- D) experiences

**Answer (A)**

**Q5. .... is not a symptom of stress?**

- A) Increased sweating
- B) Cold hands or feet
- C) Dry mouth
- D) None of these

**Answer (D)**

**Q6. What is 'M' in the 'SMART' goal setting method**

- A) Must
- B) Meaning
- C) Measurable
- D) None of these

**Answer (C)**

**Q7. What is 'S' in the 'SMART' method of goal setting?**

- A) Smart
- B) Special
- C) Speed
- D) Specific

**Answer (D)**

**Q8. Physical exercise is used as a stress management technique because**

- A) It improves blood circulation
- B) improves self-image
- C) make us feel better
- D) All of the above

**Answer (D)**

**Q9. Stress management prevents \_\_\_\_\_**

- A) psychological disorders
- B) behavioural problems
- C) both of the above
- D) none of the above

**Answer (C)**

**Q10. Self-Reliance means \_\_\_\_\_**

- A) Ability to Work Independently
- B) Complete the task effectively
- C) Both of the above
- D) None of the above

**Answer (C)**

**Short Answer Questions (2 mark )**

## **1. What do you mean by self – management skills?**

Answer – Your ability to regulate and control your actions, feelings, and thoughts is referred to as self-management skills. It also helps to improve personal and academic goals.

### **Self-management can also help in the following areas:-**

Reaching your goals  
Developing good habits  
Overcoming challenges and difficulties  
Overcoming bad habits

## **2. What are the different practices of self management skills?**

Answer – Self – management skills are –

- a. **Self – awareness** – Ability to control your values, likes, strengths, dislikes and weaknesses, etc.
- b. **Self – control** – Holding the ability to control your behavior, discipline, and so on.
- c. **Self – confidence** – Believe in yourself and don't be scared to take risks.
- d. **Problem solving** – Understanding a problem and finding the solution.
- e. **Self motivation** – Try to complete your tasks without any external help.
- f. **Personal hygiene** – Be healthy, clean and smart
- e. **Positive thinking** – Expressing certainty or affirmation even in tough situations
- f. **Teamwork** – Work in team to complete the goals
- g. **Time management** – According to your plan, achieve the task on time.
- h. **Goal setting** – Plan and accomplish the goals within a timeframe.

## **3. Write a short note on the factors influencing self – management.**

Answer – Factors influencing the self – management are patients, cognitive, mental, and behavioral ability to identify disease – related symptoms, seek treatment, and to identify physical, psychological and **6. Qualities of self – confidence?**

Answer – Qualities of self – confident people –

- a. **Self – belief** – Always believe in yourself and respect the failures, make you successful in life.
- b. **Hard Work** – Work hard to achieve the goal, don't be afraid of failures.
- c. **Positive Attitude** – Positive attitude means focusing on the goal and trying to achieve.

## **4. How to build self – confidence?**

Answer – There are three steps to build self – confidence are as follows –

- a. Step 1: Appreciate achievements & accept failures.
- b. Step 2: Make a goal and try to achieve.
- c. Step 3: Always look on the positive side and be happy.

## **5. What are the factors that decrease self – confidence?**

Answer – Some of the factors which decrease self – confidence

When we think we are unable to complete a task.

When you feel bad from the past mistakes, and unmotivated.

After failure in the first attempt, do not try again to achieve the goal.

When we are surrounded by people who have negative thoughts.

## **6. What is the importance of positive thinking?**

Answer – A person's attitude can be 'positive' or 'negative'. Positive thinking helps to be successful in life because positive people are always improving themselves. but

negative people are always worrying and looking for the bad in things, they never try to overcome the challenges.

Positive thinking produces positive outcomes for you, such as

Overcoming challenges

Always be energetic

Helping others will help you to overcome the challenge of the work.

Be happy and make others happy.

### **7. What is the importance of personal hygiene?**

Answer – Personal hygiene is very important in our daily life because it helps us

Create a good image of ourselves

Stay healthy

Avoid feeling ashamed in public due to our bad breath, body odour, etc.

### **8. What is the importance of Grooming?**

Answer – The act of putting on clothes is known as dressing. Grooming is the act of making oneself appear neat, orderly, and smart.

#### **Benefits of Dressing and grooming in daily life**

Look smart

Make a good impression of ourselves

Feel confident about ourselves

## **UNIT 3 - ICT SKILLS**

### **NOTES**

#### **Introduction to ICT-I**

ICT stands for —Information, Communication and Technology. It includes Information Technology together with main focus on communication technologies.

This includes the internet, wireless networks, cell phones, and other communication mediums.

The Basic ICT skill that we need are:

- Knowing how to operate computers
- Knowing how to work on the internet and using internet services.

#### **ICT at workplace:**

Education

- To research
  - For school administrators
  - To collect and process data
- Banking
- Can make transaction at any time
  - Save time by using online services
- Industry
- Researchers use to analyse and collect data

E-Commerce

- Make buying and selling activities easier.

#### **ICT at home:**

You can stay connected with family and friends on regular basis through social media networks like facebook, instagram etc

#### **Impact of ICT on society**

ICT has affected the society in both positive and negative ways. ICT has divided the society into two groups:

People who can do their personal and professional work efficiently. They are efficient in using services like, e-banking, e-learning, e-governance sites, etc.

People who do not have access to a computer and internet. They also do not have the knowledge to use facilities available on the internet.

This has resulted in the digital divide, which refers to the gap between people who have access to the latest information technologies, like, computer, smart phones, internet, ipad, etc. and have knowledge to use them and people who do not have access to use these devices.

### **ICT in our daily life (examples)**

ICT has a great impact in our daily life. Some of the uses of ICT in our daily life are:

- We can read newspapers online.
- We can get connected with our friends, relatives or even family members far away from us using email, messenger, video conferencing etc.
- With the introduction of video conferencing, business meetings have now become easier.
- Nowadays people use mobile phone apps to meet and connect with new and old friends.
- Social networking sites like Facebook.com have played a big role in connecting both old and new relationships.
- We can access a full library of educational material via mobile app or website on any smartphone or iPad.
- Technology has also made the buying and selling of goods and services flexible and a lot safer
- Most banks now offer online banking facilities. People make use of this service daily to manage their finances.
- Most businesses use online banking facility to pay employees/vendors and transfer money to their bank accounts

### **ICT Tools**

ICT tools are devices that are used in Information and communication technology. For example, computer, smart phone, radio, television, iPad, tablets, etc.

Some of these are :

#### 1. Mobile

Mobile phones are the easiest and simplest way of communication. They are small in size, lightweight and portable. You can stay in touch with your friends, relatives, anytime and anywhere. Mobile phones are useful in studies.

Students can access the internet on their mobile phones and get information on any topic. You can even create documents, make presentations, etc. on your smart phones as you do on your computer.

#### 2. Tablets

Tablets are small personal computers with a touch screen. Tablets allow users to input data and instructions through keyboard or mouse. Learning software apps can be downloaded onto tablets. You can also watch videos relevant to your subject.

#### 3. Radio

Radio is the oldest tool used to provide entertainment and information to people. You can listen to music, radio shows, etc. on radio.

#### 4.TV (Television)

Tele means distance, vision means seeing. TV means seeing at a distance. You can watch music, view programs, etc. on television.

#### 5. Online Newspaper

News related to all the issues, national, international, sports, space etc, can be read online.

#### 6. Email

Email is the most common way of communication in today's world. It is an official way of communication. Some of the advantages of using email are:

You don't have to pay anything extra for sending or receiving email. You just pay for the internet connection.

You can send bulk mails

The receiver may not be online when you send the email But still it will be available in the mailbox and can be viewed later.

You can send documents, presentations, images, videos, etc. as an attachment to email.

When you send an email, it reaches the receiver at any part of the world in few seconds

### **QUESTION AND ANSWERS - DIY(Do It Yourself)**

#### **Multiple Choice Questions:**

1. ICT stands for \_\_\_\_\_.

- a. Information and Communication Technology
- b. Informed and Communicated Technology
- c. Informal and Communication Technology
- d. None of the above

2. \_\_\_\_\_ skills help us to communicate, run our business and stay connected with our family and friends.

- a. ICT
- b. ITI
- c. Mobile App
- d. None of the above.

3. How we can save Information in digital form.

- a. Using Computer
- b. Hand Written on paper
- c. Typed using typewriter
- d. All of the above.

4. Which one is the ICT device\_\_\_\_\_.

- a. Tablet
  - b. Smart Phone
  - c. Laptops
  - d. All of the above.
5. The ICT skills that you need are
- a. Knowing how to operate computer
  - b. Knowing how to browse the Internet for collecting
  - c. Storing and dissemination information
  - d. All of the above
6. Modern ICT employs a variety of media forms, which includes
- a. Text & Graphics
  - b. Audio & Video
  - c. Animation
  - d. All of the above
7. \_\_\_\_\_ Device is used to receive broadcast audio sound.
- a. Radio
  - b. TV
  - c. Computer
  - d. Laptop
8. Some of the apps are already present on the phone or tablet, These are called \_\_\_\_\_ apps.
- a. Android App
  - b. Apple App
  - c. Default App
  - d. None of the above

2 marks questions:

1. What is the Impact of ICT on society?
2. What are ICT tools?

## **BASIC COMPONENTS OF COMPUTER SYSTEM**

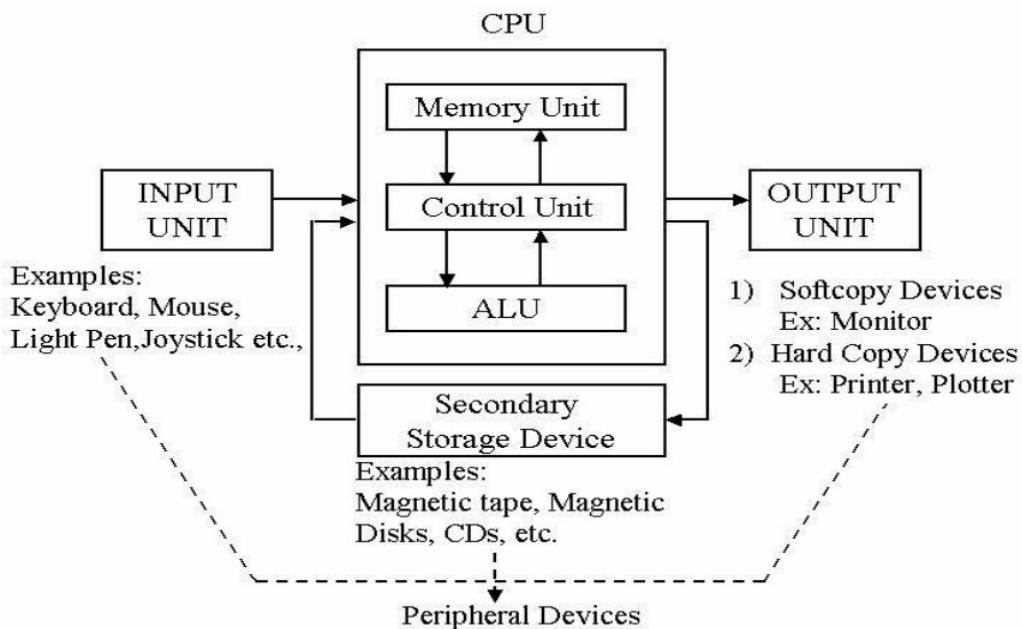
**A computer** is an electronic device that accepts data from input devices, store data in storage devices, process it using processing device and displays output using output devices.

### **HARDWARE AND SOFTWARE**

A computer system comprises of hardware and software.

- **Computer hardware** – Physical parts of a computer such as Input devices, output devices, central processing unit and storage devices are called computer hardware.
- **Computer software** – Software are the programs or applications that run on computer. For example, MS Word, MS PowerPoint, Operating systems, etc.

### **Computer hardware**



The physical components of a computer system are called hardware. A computer basically consists of following physical components:

- Input unit
- Processing unit
- Storage unit
- Auxiliary storage
- Output unit

### **Input Unit**

Input Unit comprises of Input devices which are used for entering data or instructions into the computer.

Commonly used input devices: keyboard, mouse, scanner, web camera etc.



## **The Central Processing Unit (CPU)**

The Central Processing Unit is the brain of the computer system.

### **Functions of Central Processing Unit are:**

- It controls the sequence of operations within the computer
- It gives commands to other parts of the computer
- It controls the use of main memory for storing data and instructions

### **It consists of the following main units:**

- Arithmetic and Logic unit (ALU)
- Control Unit (CU)
- Main Memory Unit

### **Arithmetic and Logic Unit (ALU)**

All the calculations and comparisons are done in this unit.

The ALU performs all the following arithmetic operations:

- + (addition)
- (subtraction)
- \*(multiplication)
- /(Division)
- ^(Exponent)

The ALU also performs the following logical operations:

- < (less than)
- <= (less than or equal to)
- >= (greater than or equal to)
- <> (not equal to)

### **Control Unit**

The control unit controls the flow of data from the input devices to memory and from memory to output devices. It does not process the data. When the processing begins, the first instruction of the program is selected and fed into the control section of the primary storage area. It is then interpreted there and then the signals are sent to other components to perform the necessary action. The next instruction, is then selected, interpreted, and executed. This is continued till all the instructions are processed.

### **Registers**

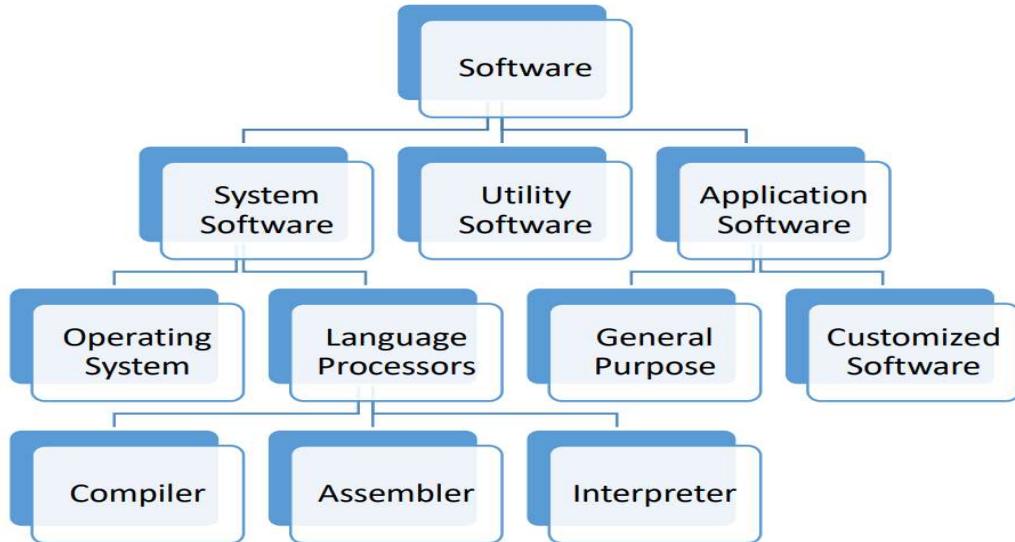
These are temporary storage areas found in CPU of modern computers.

### **Output Unit**

The output unit comprises of devices such as Monitor, Printer, speaker, etc. to display information to the user.

### **Software**

Software is a set of computer programs that perform a particular task. Following are the categories of software:



### **System Software**

System software is a set of one or more programs designed to control the operation of a computer system.

Operating systems and language processors come under the category of system software.

#### **Operating System**

Operating system is a master control program that runs the computer. When the computer is switched on, operating system is the first program loaded into the computer's memory.

Examples of operating system are Windows, UNIX, MS-DOS, Mac OS, Solaris, etc.

#### **Language Processors**

A computer understands instructions in the form of machine code, i.e., 0 and 1. The programs are written in English like high level language called source code. The source code must be converted into machine language in order to be executed. The translator program that is used to convert source program written in high level language to machine code is called language processor. The program translated into machine code is called the object program.

Language processor is of three types:

1. **Assembler**:- It is a program that translates an assembly language program into machine language.
2. **Compiler**:- It is a program that translates a high-level language program into machine language. For example C++ compiler.
3. **Interpreter**:- It is a program that translates a high-level language into machine language program line by line. For example, Visual basic Interpreter.

#### **Application Software**

Application software is a computer program that is designed to perform a certain type of work. This type of software pertains to one specific application. For example, software written to calculate salary of the school employees cannot be used to prepare school result.

Application softwares can be classified as General purpose software and Specific purpose application software.

**General purpose application software** includes word processing software, like, Microsoft Word., spreadsheet software, like, Microsoft Excel, etc.

**Specific Purpose Application software** are the softwares that perform a particular task. Examples of specific purpose application software are Accounting management software, Reservation system, Payroll system, etc.

### **Utility Program**

A utility program is used to perform maintenance work on a system or on the components of the computer.

Examples of Utility program are;- antivirus software, file management programs, etc.

**Antivirus software**:- This program helps in detecting and removing viruses. For example, Norton antivirus, McAfee virus scan, etc.

**File management tools**:-These tools help in storing, searching, and sorting files and folders on the system. For example, Windows Explorer.

**Compression**:- This program helps in compression of large files so that they take less storage space. For example, WinZip.

**Disk Management Tools**:- These programs include

- **Disk Cleaner**:-This utility scans for the files that have not been used since long. These files may be occupying large amount of space. It prompts the user to delete such files to create more disk space.

- **Disk Defragmenter**:-It rearranges the files and free space on the computer so that files are stored in contiguous and free space is consolidated in one contiguous block. This speeds up the disk access.

- **Backup**:- backup means making a duplicate of the files and data stored on the computer. This program is used to take backup copy of the data. In case the original data is lost, the backed up data can be used.

## **MEMORY DEVICES & UNITS**

The Storage unit/ Memory unit consists of the following components:

- Primary storage
- Secondary Storage

### **1. Primary Storage**

The primary storage is also called the primary memory. It is directly accessible by the CPU. It can be:

- RAM (Random Access Memory)
- ROM (Read Only Memory)

Functions of primary memory are:

- Here data is fed and held until it is ready to be accessed.
- It is used to hold the data being processed and the intermediate results of processing.
- It holds the result of the processing.
- It holds the processing instructions.

### **Memory Units**

Units of computer memory are:- Bit (Binary Digit), Byte (Kilobyte, Megabyte, GigaByte, TeraByte, PetaByte, ExaByte, ZettaByte, YottaByte)

The elementary unit of memory is a bit. A group of 4 bits is called a nibble and a group of 8 bits is called a byte.

One byte is the minimum space required to store one character.

1 Byte = 8 bits

One kilobyte (KB) = 1024 bytes

One Megabyte (MB) =  $1024 \text{ KB} = 1024 \times 1024$  bytes

One Gigabyte (GB) =  $1024 \text{ MB} = 1024 \times 1024 \times 1024$  bytes

One Terabyte (TB) =  $1024 \text{ GB} = 1024 \times 1024 \times 1024 \times 1024$  bytes

One petabyte (PB) =  $1024 \text{ TB} = 1024 \times 1024 \times 1024 \times 1024 \times 1024$  bytes

One ExaByte (EB) =  $1024 \text{ PB} = 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024$  bytes

One ZettaByte (ZB) =  $1024 \text{ EB} = 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024$  bytes

### **Random Access Memory (RAM)**

RAM is used to hold active information of data and instructions. Information in RAM is stored in random order, that is why it is known as Random Access Memory.

It is a temporary memory. When power supply is switched off, the information stored in RAM is lost, so it is also known as volatile memory.

It is also known as read/write memory as information can be read from RAM and also written onto it.

Information stored in RAM may be erased or written over.

### **Read-Only memory (ROM)**

ROM is a part of computer's main memory. It is used to store the instructions provided by the manufacturer to check basic hardware and to load operating system from appropriate storage device.

The storage of data and instructions in ROM is permanent until it is written over.

The contents of the ROM are not lost when power supply is switched off. That is why, ROM is called non-volatile memory.

## **2. Secondary Storage**

Since the computer's main memory stores the data and information temporarily, the secondary memory is used. Secondary memory is used to store bulk of information.

The information stored in secondary memory is not lost, so it is also a non-volatile memory. These devices are non-volatile as data is stored in these devices till it is deleted. Secondary storage devices include hard disk, CD, DVDs, Pen drive etc.

## **QUESTION AND ANSWERS**

### **1 Mark Questions**

1. Give full form of ALU
2. Give full form of CU
3. Give full form of CPU
4. Name the unit of computer that controls the flow of data from input device to memory.
5. Which unit of computer is called the brain of the computer?
6. Name the unit of computer where arithmetic operations are performed.
7. Identify and name anti-virus software installed in your computer.
8. Name the program that rearranges the files and folders in the computer system.
9. Give example for file management tool.
10. Give full form of RAM
11. Give full form of ROM
12. What is one byte?
13. Arrange in increasing order of storage capacity.  
TB, MB, GB, KB, Byte
14. Name the memory which is also known as read/write memory.
15. A group of 4 bits is called \_\_\_\_\_

16. The elementary unit of memory is \_\_\_\_\_

**2 Marks Questions**

1. Name logical operations that can be performed in ALU
2. Differentiate between hardware and software.
3. Identify and name any 4 application software installed in your computer.
4. Which memory- RAM or ROM is called the volatile memory and why?
5. Complete the following:
  - a. 1 KB= \_\_\_\_\_ Bytes
  - b. 1 GB = \_\_\_\_\_ bytes

**3 Marks Questions**

1. Identify the following arithmetic operations:
  - a. \*
  - b. ^
  - c. /
2. Identify as hardware or software.  
Monitor  
MS Word  
Operating system  
Mouse  
Keyboard  
MS PowerPoint
3. Name any three input devices
4. List any three hardware devices.
5. List any three software.
6. What is the difference between system software and application software?
7. Name any three disk management tools.
8. Write short notes on language processors.
9. Name any three output devices.
10. Write short notes on Utility programme.

**4 Marks Questions**

1. Discuss various components of a computer system.
2. Discuss different types of software.
3. Explain Memory/ storage unit.

## Internet and its Applications

**Content:**

- Internet and its Components
- A Word Wide Web
- A Website
- Web page
- Web portal
- A Web browser
- A Blogs

**Introduction:**

Networks are everywhere: Any multiple things connecting together and enhancing reach form a network. You have heard about terms like network of roads, network of rails and network of computers around the globe, the internet. In this chapter, we shall talk about some technical basics related to networks especially Internet.

### **Internet and its components:**

As you all know that Internet is a computer-based worldwide information network. It can be assumed as an example of WAN (Wide Area Network). The Internet is composed of a number of large smaller interconnected networks. These networks may link tens, hundreds, or thousands of computers, enabling them to share information with each other and to share various resources, such as powerful supercomputers and databases (collection of data) of information. The Internet has made it possible for people all over the world to effectively and inexpensively communicate with each other. Unlike traditional broadcasting media, such as radio and television, the Internet is a decentralized system. Each connected individual can communicate with anyone else on the Internet, can publish ideas, and can sell products with a minimum overhead cost.

**Definition:** Internet is a computer based world wide communications network, which is composed of large number of smaller interconnected networks.

Internet is not a thing which you can touch and feel. It is made of up many components offering various different types of services. Let us talk about these Internet components in coming lines.

### **World Wide Web (WWW):**

From the late 1960s to the early 1990s, the Internet was a Communication and research tool used almost exclusively for academic and military purposes. This changed radically with the introduction of the World Wide Web (WWW) or Web in short in 1989. The www is a set of programs, standards and protocols governing the way in which multimedia files (multimedia files are the documents that contain a combination of text, photographs, graphics, video and audio) are created and displayed on the Internet.

**Definition:** The World Wide Web: (WWW) is a set of programs, standards, and protocols that allows the multimedia and hypertext files to be created, displayed and linked on the Internet.

Before WWW, Internet was mainly used for obtaining textual formation. But post-WWW, the Internet popularity grew tremendously because of graphic-intensive nature of WWW. Therefore, we may attribute the explosion in use and popularity of Internet to WWW only. The World Wide Web (WWW) is also affectionately called "The Web". WWW was proposed between 1989-1991 by Tim Berners-Lee. Proposed in 1989, WWW became a reality with invention of HTML and a text browser in 1990.

## **Difference between WWW and Internet:**

Most people think that www is Internet and vice versa, which is NOT TRUE.

A large part of the Internet is the 'World Wide Web' (Www). This is made up of web sites that have one or more web pages. This is the part of the Internet that you probably use most of the time.

But the Internet isn't just the web pages that you use every day. It also consists of:

- forums where people can seek help and advice about a topic.
- Research databases used by universities and large companies.
- USENET - discussion groups about a specific subject from the latest boy band to favourite pets - for example, Google Groups.
- Email and Instant Messaging (IM) systems.

**Note:** WWW was proposed between 1989-1991 by Tim Berners-Lee.

It is really important to understand that the Internet is not the same as the WWW. The Internet is to the World Wide Web as Europe is to Germany. One is the container; the other is an item within the container.

**Note:** While Internet is a collection of computers or networking devices connected together; WWW is a collection of documents, linked via special links called hyperlinks. WWW forms a large part of Internet but is not the Internet.

## **Internet Terminology**

Before we proceed further, it will be good if we briefly talk about Internet terminology. In the following lines, we are introducing some basic terms related to Internet.

**Client:** Any computer on the networks that requests services from another computer on the Internet.

**Server:** Any computer that receives requests from client computers, processes and sends the output. Web Servers respond to web related request. There can be other types of Servers to handle different type of requests/actions.

**Webpage:** Any digital page/document hosted on Internet (i.e., accessible via Internet.)

**Web site:** A collection of interconnected webpages, designed with a certain goal in mind.

**Web portal:** A web site or service that offers a broad array of resources such as e-mail, forums, search-engines among others, e.g., sites like MSN, Yahoo, Indiatimes etc.

**Web browser:** A program or software on a client computer, that retrieves information from the web. Examples are Internet Explorer, Google Chrome, Mozilla Firefox, Netscape, Mosaic Opera, Safari, Lynx etc.

**Web Client:** A web client is a program or a component on client side that requests and 11s services provided by web server. Examples of web clients are web browser, a specific web page with components fetching information from web server, email programs, file sharing programs, chat Web programs etc.

**URL:** Uniform Resource Locator It is the unique address of a web page on Internet.

**Blog:** Short for Web log, a blog is a web page that serves as a publicly accessible personal journal for an individual. A blog is a frequently updated online personal journal or diary.

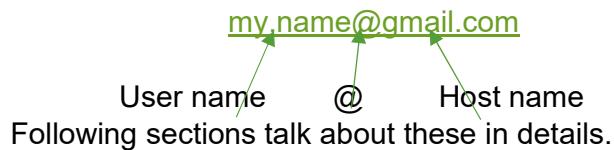
**Blogger:** The author of a blog is called blogger. A blogger is the one who regularly writes and updates entries in his/her blog.

Blogging: The action of writing blog is called blogging.

**Newsgroup:** Newsgroups are Internet discussion forums where groups of users with common interests gather to discuss on a common topic of interest.

Email: Short for electronic mail, email refers to messages distributed by electronic means from one computer user to one or more recipients via a network mostly Internet.

**Email Address:** Every email has a unique electronic post-office-box with a unique address on a network where e-mail can be sent; this unique address is known as email address. Each email address has three sections. Let's look at the example below:



## **Web Site**

A web site is a collection of web pages which are digital files generally written using HyperText Markup Language (HTML). For a web site to be available to everyone in the world at all times, it must be stored or "hosted" on a computer that is connected to the Internet round the clock. Such a computer is known as a Web server.

**Definition:** A website or a site is a group of related web pages hosted on a web server and are linked together and share a common interface and design.

The web pages of a website are linked together (through hyperlinks and hypertext) and share a common interface and design. The site might also contain additional documents and files such as images, videos or other digital assets.

With Internet invading in every sphere, we see websites for all kind of causes and purposes. So, we can also say that a website also be thought of as a digital environment capable of delivering information and solutions and promoting interaction between people, places, and things to support the goals of the organization it was created for.

## **Components of a Website**

As you know that a website is a collection of related webpages hosted on a webserver. There are some components essential for making a website. These are being listed below.

**Webhost:** Hosting is where a website is physically located. Group of linked webpages qualify to be called a website only when hosted on a webserver. On a webserver, somewhere, are a set of files that are transmitted to user computers when they specify the address of the website.

**Address:** This is the address of the website (also called URL of the site). When someone asks to see a website, (s)he needs to put this address into the web browser, and the asked site is delivered by the webserver.

**Homepage:** Every website has a home page. It is the first web page that appears when viewers go to a website. Home page of a website is very important as it sets the look and feel of the website and directs viewers to the rest of the pages in the website.

**Design:** It is the overall look and feel the website has as a result of proper use and integration elements like navigation menus, graphics, layout etc.

**Content:** All the webpages contained in the website together make up the content of the website.

**The Navigation Structure:** The navigation structure of a website is the order of the pages, the collection of what links to what. Usually, it is held together by at least one navigation menu.

**Note:** We have given above the components of website, not a web often people mistakenly consider components of webpage as components of a website. But there is a difference, which will be clear to you when we cover later the components of a webpage.

### Website vs. Portal

As you already know that a website is a collection of related web pages. It is hosted on at least one web server, accessible via a network through an Internet address known as a URL (uniform Resource Locator). A Portal or a web portal also has similar characteristics, but there is 4 Key difference between a website and a portal, which you must know.

A Web Portal is a launch pad to a host of web-based Services such as email, shopping, gaming, news, weather and so on whereas a website is concerned with providing information about a company cause only. For a User, a portal is the entry point for using these services. A website on the other hand provides some specific type of information.

**Note:** A Web portal is also a type of website but it differs in content and services from a typical website that provides only specialized information and links to sites about them.

Following table lists the differences between these two.

SI No	Web Portal (Portal)	Website
1	Collection of launch webpages of array of web services like email, search engine, weather, gaming news etc.	Collection of webpages offering a specialized content pertaining to the need and goal of the organization owning the website.
2	It is normally an entry point or gateway for using the offering services.	It is often the final destination to access and use the provided specific information.
3	Generally linked to many other websites that provide these web-service.	A website is generally linked to its own webpages.
4	A complete environment for managing and integrating a large number of diverse applications.	Caters to or delivers one specific type of content application or content as per the goal of the website.
5	Examples: Yahoo, Rediff, MSN, AOL etc.	Examples edupillar.com, cbseacademic.in, ncert.nic.in etc.

## Web Pages

A webpage is a digital document that is linked to the World Wide Web and viewable by anyone connected to the internet having a web browser. It can contain any type of information, such as text, colour, graphics, animation, video and sound etc.

Content wise the components of a webpage are: Hypertext and Hyperlinks

Hypertext refers to a digital text, which is more than just text as it can include information in various media formats such as

- Text
- Images
- Graphics
- Video
- Sound
- Hyperlinks

Hyperlink refers to a link from a hypertext hyperlink can be file to another such file. A in the form of a graphic or text, upon clicking where the linked document opens up

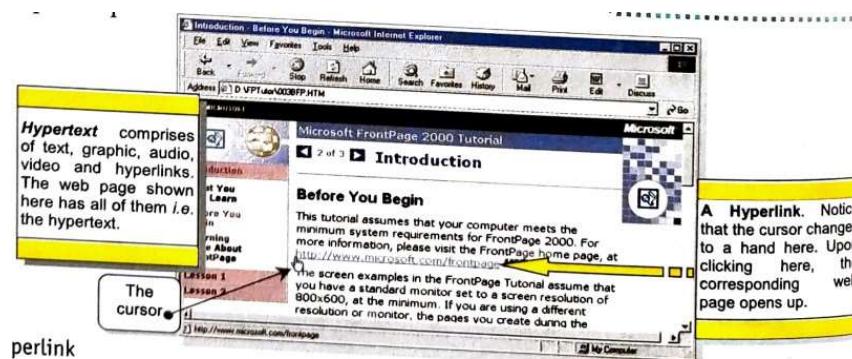


Figure : Hypertext and hyperlink

## Web Browsers

A web browser is a program that lets you visit different sites on the Net and display their offering on your own computer. You visit a site by supplying the browser with an address, or URL. Specifically, browsers are intended to let you access hypertext files in the form of web resources on World Wide Web pages. However, you can use a browser to access other types file systems as well.

**Definition:** A web browser is a program that lets you visit different sites on the Net and display their offerings on your own computer.

There are many browsers available in the market e.g., Google Chrome, Mosaic, Netscape, Internet Explorer, Safari, Opera, Macweb etc. but only few of them such as Netscape, Navigator, Google Chrome, Mozilla Firefox and Microsoft Internet Explorer appears just about everywhere. Though, MOSAIC (developed by NCSA - National Centre for Outing Application) was the first web browser to come into Supe market.

## **Blogs**

A blog is a kind of website. The term "blog" is the shortened form of "Weblog"- a diary or journal on the Web. The owner of the blog writes on the blog and is known as blogger or author of the blog. The activity of updating or writing for blog is called blogging.

The "blogger" (or author) writes periodically about a certain topic of his or her choosing (personal experiences, thoughts, hobbies, political aspirations, etc.). The blogger can provide links to other websites that s/he thinks might interest the audience. The updates put on the blog by the blogger are called blog-posts.

Blogs usually have a few features that are useful for the blogger and the readers.\

**Definition:** A blog refers to an online journal where entries are posted. The word blog has been derived from weblog.

**Definition:** A person who writes and maintains a blog is called blogger and art of writing a blog is called blogging.

## **Types of Blogs**

Web of today has millions upon millions of blogs. There are blogs maintained by individuals, there are blogs maintained by companies or organizations on the web, and then there are blogs dedicated to factual information like news, and so on. But, one thing is common - they tend to fall into these types of blogs:

1. **Personal blog.** This is the most common type of blog. Maximum numbers of blogs on Internet belong to this category. After all, blogging started off as a way of creating an online diary. A typical blogger may be keen on posting stories about their interest such as fishing, or dancing or collecting something.
2. **News and views.** This type of blog contains factual stories about News, maintained by journalists. News and television companies such as the BBC have many professional journalists who post stories and views about the latest events. Visitors can add their own opinions as well.
3. **Company blogs.** Many companies use blogs to let Customers and clients know what is going on in the company that would interest clients or customers such as new products coming up or progress being made on some projects.
4. **Micro-blogs.** This is a new type of blog where one can Post very short comments that others can follow Twitter is the best example of a micro blog where one can only post 140 characters with each entry called a Tweet. The entries become a running commentary about one's life and interest.

## **QUESTION AND ANSWERS**

### **One Mark questions:**

1. What is the Internet?
2. What's the best way to describe the Internet?
3. What is World Wide Web?
4. How is the World Wide Web accessed?
5. What name do we give to a computer that hosts websites?
6. Define Web Browser.
7. Unique address of anything accessible via WWW is identified through its \_\_\_\_\_.
8. Give an example of an email address.
9. Give an example of a URL.
10. A web-site is a collection of \_\_\_\_\_
11. HTML is an acronym for \_\_\_\_\_
12. The first page that you normally view at a web site is its \_\_\_\_\_
13. When you visit a website, it will open the page set as \_\_\_\_\_ of the website.
14. The first page on a website that allows you to navigate to other pages via menu system or links, is known as \_\_\_\_\_
15. Web pages on a site are linked are linked together through a system of \_\_\_\_\_
16. Online personal journal where one can post her entries to which others can post comments is called \_\_\_\_\_
17. To connect to the Internet, the computer has to be connected to the \_\_\_\_\_
18. Give an example of Web browser \_\_\_\_\_

### **Two Marks questions:**

1. What is WWW? How does it function?
2. What is a server? What is a web server?
3. Differentiate between a web page and a home page.
4. What are the components of a webpage?
5. What is a web site? How is it related to a web page and a home page?
6. What is blogging? What are its advantages and disadvantages?
7. What do you understand by a (i) Web browser (ii) Web server?
8. Search for some sites that let you create blogs.

### **Three Marks questions:**

1. Differentiate between WWW & Internet.
2. What is Internet? Describe WWW.
3. What is website? Explain.
4. Explain Web Browsers.
5. What is Webpage? Explain Hypertext & Hyperlink.
6. Define Blogs. What is the meaning of Blogger, Blogging & Blog post.

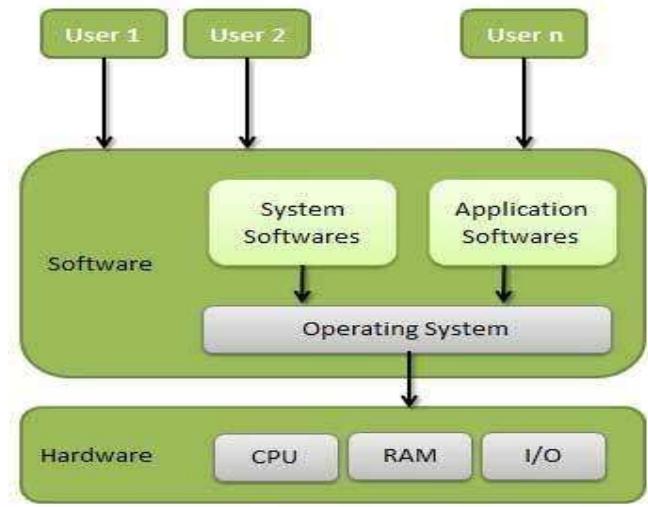
### **Four Marks questions:**

1. Define Internet and Describe its applications in short.
2. Explain Internet Terminologies.
3. What is website? Describe the components of Website.

4. Differentiate between Web Portal & Website.
5. What is Blog? Explain types of Blogs.

### **What is an operating system?**

Operating system act as an interface between user and a computer. An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer.



### **Examples of an Operating system**

1. DOS (Disk Operating System)
2. Windows : It is an operating system developed by Microsoft.
3. Linux : It is an operating system designed for personal computers. It is a free and open-source software.
4. Mobile operating Systems
  1. Android
  2. Symbian
  3. Windows Phone
  4. iOS

### **Functions of Operating system are:**

1. It manages all the devices of a computer.
2. It checks whether the device is functioning properly or not.
3. It controls software resources of the computer.
4. It manages the computer memory.
5. It keeps track of the amount of disk space used by a specific file.
6. It allows you to create, copy, move and delete files.

## **Types of Operating Systems :**

- 1) Interactive (GUI-based) : A graphical user interface in which commands can be entered by clicking/double-clicking/right clicking a mouse. for example Windows
- 2) Single-user, single-task operating system : This type of operating system allows only one user to do a task on the computer and one thing at a time.
- 3) Single-user, multi-task operating system : This type of operating system where a single user can operate on several programs at the same time. for example Windows, Apple MacOS.
- 4) Multi-user : A multi-user operating system enables multiple users to work on the same computer at different times or simultaneously.
- 5) Real Time : A real time operating system is used to control machinery, scientific instruments like robots. A real-time operating system is a computing environment that reacts to input within a specific period of time. Windows CE and Lynx OS are examples of real-time operating systems.
- 6) Distributed : A distributed operating system combines different computers in the network into a single integrated computer and storage location. for example Windows, UNIX, and LINUX .

## **Mobile operating Systems**

### **Some popular operating systems that are used in mobile phones are:**

- 1.Android It is an operating system used in mobile phones and tablets. It is owned and maintained by Google and is an open-source operating system. The android releases were nicknamed after sweets or dessert items like Cupcake (1.5), Donut (1.6), Éclair (2.0), Frozen Yogurt (2.2), Honeycomb (3.0) and Jelly Bean (4.1), Kitkat (4.4), marshmallow (6.0),
- 2.Symbian It is an operating system used in mobile phones. Symbian was developed and sold by Symbian Ltd. It is primarily used by Nokia. It is also used by Japanese mobile phone manufacturers for handsets sold in Japan.
- 3.Windows Phone It is a mobile operating system developed by Microsoft for smart phones and pocket PCs. Windows Mobile. Windows 8.1 is the latest release of this operating system. iOS It is a mobile operating system developed by Apple Inc. for iPhones, iPads, and iPods. It is supported only by Apple hardware. iOS 9 is the latest release of this operating system.

## **QUESTION AND ANSWERS**

### **MCQ**

- 1 \_\_\_\_\_ act as an interface between the user and the computer.
2. Software that starts working as soon as we switch on a computer is
3. Microsoft Windows is a(n)
4. Which of the following is an example of a real time operating system?
5. Which of the following operating system does not implement the multitasking truly?
6. .... is the layer of a computer system between the hardware and the user program
7. GUI stands for.....

### **2 marks question**

- Q1. What is an operating system?
- Q2. Write 2 functions of operating system
- Q3. Name any two mobile operating systems.

### **3 marks question**

- Q1. List any 3 types of operating systems.
- Q2. Explain real time operating system.

### **4 marks question**

- Q1. What are the various objectives and functions of Operating systems?

## **Activities**

### **Activity 1**

#### **Getting started with mobile devices**

- Form groups depending on the number of smartphones and Tablet available. For example, if you have 2 smartphones and 3 tablet, form 5 groups.
- The group studies the basic features of smartphone or a tablet. Note down the names of the Apps or icons you see in the smartphone/tablet. Compare the differences between tablet and smartphones.

### **Activity 2**

#### **Getting familiar with a mobile device**

- Form groups' depending on the number of mobile devices available. For example, if you have 3 smartphones and 2 Tablet, form 5 groups.

- Each member starts the device and notes down the names of icons in the status bar and the dock. One group of volunteers shall come in front of the class and read aloud what they have noted.
- The class then discusses the various features of the icons.

### **Activity 3**

#### **Knowing your computer**

- Form groups of 5 students each group.
- List the basic input output devices you need in a computer.
- Draw a diagram of a computer system showing all the devices connected to it. Label the diagram and mention the uses of the various devices.
- One volunteer from the group presents the illustration to the class and explains it to the students.

### **Activity 4**

#### **Advantages of using e-mail**

- Form groups of 5 students each.
- Discuss how writing e-mail is better than sending a letter through postal mail. Every student says whether he/she prefers to send an e-mail or post a letter and why.

### **QUESTION AND ANSWERS**

#### **Q1.What are the Objectives of Information and communication technology?**

Answer – Full form of ICT is Information and communication technology. The goal of ICT is to bridge the gap between parents, educators, and students by encouraging sustainable, cooperative, and transparent communication methods.

#### **Q2 What are the advantages of ICT?**

##### Advantages of ICT

Enhanced the modes of communication  
Independent learning platforms Cost – efficient  
Enhanced data and information security  
Paperless – Eliminate the usage of paper  
Better teaching and learning methods  
Web – based LMS tools

#### **Q3 What are the disadvantages of ICT?**

##### Disadvantages of ICT

Traditional book and handwritten methods are at risk.  
Managing courses online is difficult  
Teachers require experience to handle ICT  
Risk of cyber attacks and hacks  
Misuse of technology

#### **Q4 What are the default apps installed on smartphones?**

Answer – Some of the default apps installed on smartphones are

Camera

Phone

Calendar  
Mail  
Maps  
Clock  
Message  
Web Browser  
Music  
Google Play store  
Apple Store

#### **Q5 Differentiate between smartphone vs. tablet.**

Answer – **Smartphone** – Smartphones are just like a phone with some additional features, Smartphones are compact and easy to use. Operating systems are the main software. Some of the smartphones use Apple iOS, some are using Android OS or some are using Microsoft OS. editing the videos or photos is difficult on the smartphone.

**Tablet** – It is a portable personal computer with a touchscreen interface which makes it more user friendly than the notebook computer. Android OS, Apple iOS or Windows OS are the most common operating systems used in the tablet. As compared to smartphones, tablet screens are bigger in size.

#### **Q6 What are the features of mobile devices?**

Answer – Some of the features present in mobile devices are

- a. **Bluetooth**: Bluetooth is a wireless technology which connects with other Bluetooth devices within 30 feet, you can send photos, songs or video with the help of the Bluetooth.
- b. **Chargeable Battery**: This is a portable power bank which can be recharged. if once the battery is charged you can use this device anywhere.
- c. **Wi-Fi**: Wi-Fi stands for Wireless Fidelity, basically it is a wireless network technology that connects your device to the internet or you can connect to the local area network also.
- d. **Touch Screen**: Touch Screen is an interface where you can manage your device. Whatever information you want to type in the device you can type using the touch screen.
- e. **Cellular network connectivity**: Cellular network connectivity provides the network through which you can make calls.
- f. **Global Positioning System**: It is a navigation system which helps you to find the direction of place using a map.

#### **Q7 What is the purpose of gestures in mobile devices?**

Answer – Gestures help users to interact with the touchscreen. for example if you want to open an app instead of clicking you just touch the app the application will be open.

Some of the gestures in mobile phone are

- a. **Tap and hold**: Tap and hold is similar to right-clicking on a computer.
- b. **Swipe**: Swipe the finger to right, left, up or down on the screen, automatically the page will move to the next page.
- c. **Tap**: Touch the screen with your finger, once, to click.
- d. **Double tap**: Tap the screen twice time quickly the screen will zoom, it is used to making the word appear bigger.
- e. **Drag**: To tap, hold and move your finger across the screen.
- f. **Pinch**: To bring your thumb and finger together on the screen automatically the screen will be zoomed in. it is used to making the word appear smaller.

#### **Q8 What is the basic function of a Computer?**

**Answer –** A computer is an electronic device which can accept data from the user, process the data and generate meaningful results. Computer have a three main units –

1. Input Unit,
2. Central Processing Unit (CPU) and
3. Output Unit.

#### **Q9 What are the different parts of the CPU?**

**Answer –** A computer is made up of multiple parts that work together to perform the processing and effective functioning of the computer.

The CPU performs all the basic arithmetic and logical operations of the computer.

There are three main components of a CPU (Central Processing Unit)

1. Arithmetic and Logic Unit (ALU)
2. Control Unit (CU)
3. Memory Unit (MU)

#### **Q10 What is Motherboard?**

**Answer –** A motherboard provides connectivity between the hardware components of a computer. It is also the backbone of the computer and shares the information between them. It is a main circuit board inside a computer that connects input, processing and output devices.

#### **Q11. How is the data measured in the computer?**

**Answer –** In the memory devices data is stored in the form of bits and bytes. Bit is the smallest unit which represents 0 or 1. combination of eight bits make a one byte. which store the numerical, letters or symbols value in the memory.

8 Bits = 01 Byte

1024 Bytes = 01 Kilobyte (KB)

1024 Kilobyte (KB) = 01 Megabyte (MB)

1024 Megabyte (MB) = 01 Gigabyte (GB)

1024 Gigabyte (GB) = 01 Terabyte (TB)

#### **Q12 Where are the different ports in the computer system?**

**Answer –** A port is a physical docking point using which an external device can be connected to the computer. We can connect our keyboard, mouse, printer and scanner through the port

There are several types of ports that you can use to connect a computer to external devices.

- a. **Universal serial bus or the USB port** – USB port is used to transfer data, It also works as an interface for peripheral devices. It connects, such as a mouse or a keyboard or a printer to a computer using the cable.
- b. **Display port** – Separate video connector is used for transmitting only video signals. Display port connect the monitor to the display unit. Different types of video connector are available, like High Definition Multimedia Interface (HDMI) and Video Graphics Array depending on the requirement.
- c. **Audio ports** – Audio ports are used to connect speakers or other audio devices with the computer. like headphones, speakers or microphone. headphones and speaker port is known as line out port and microphone port is known as line in port.
- d. **Ethernet** – Ethernet port is used for connecting computers to the network, with the ethernet port we can transfer data from one computer to another or we can transfer high speed internet.
- e. **Power port** – Power port is used for connecting the computer system to the power supply.

### **Q13 Difference between Hardware and Software?**

Answer – A computer system consists of two main parts – the hardware and the software.

- a. **Hardware** – The physical parts of the computer are hardware, hardware devices can be touch and feel. for example Mouse, Keyboard, Monitor, CPU, etc.
- b. **Software** – Software is made by programs; it is a set of instructions used to execute specific tasks. for example Microsoft Office, Operating System, Photo editing software.

### **Q14 In computer systems, what is the function of the BIOS?**

Answer – BIOS stands for Basic Input/ Output System, Computer automatically runs a basic program called BIOS as soon as it is switched on or the power button is pushed on.

The BIOS first does a self-test. If the self-test shows that the computer is fine, the BIOS will load the Operating System.

### **Q15 What are the different types of keys in Keyboard?**

Answer –

- a. **Function keys** – F1 to F12 are function keys in the keyboard, function keys are used for specific purposes.
- b. **Control keys** – SHIFT, CONTROL (CTRL), ALT, SPACEBAR, TAB AND CAPS LOCK are known as a control key, these keys are used as per the demand.
- c. **Enter key** – ENTER or RETURN keys are known as Enter key, depending on the brand of computer that you are using.
- d. **Punctuation keys** – It includes keys for punctuation marks, such as colon (:), semicolon (;), question mark (?), single quotation marks (''), and double quotation marks ("").
- e. **Navigation keys** – END, HOME, PAGE DOWN, PAGE UP and Arrow keys are known as navigation keys, these keys are used to move up, down, left or right in the document.
- f. **Command keys** – BACKSPACE, INSERT (INS) and DELETE(DEL) are known as command keys. INSERT key allows you to overwrite characters to the right side. The DELETE command key and BACKSPACE key are used to remove typed text, character, or any other objects from the right and left side of the cursor.
- g. **Windows key** – Windows key is used to open the Start menu.

### **Q16 What are files and folders in a computer system?**

Answer –

- a. **File** – File is a collection of information different types of files store different types of information. Every file has a file name and extension that identifies the type of file.
- b. **Folder** – Folder is a collection of files or a group of files.

### **Q17 What is Bandwidth?**

Answer – Bandwidth is the amount of data that can be transferred or received every second. and it is measured by bps (Bite per second).

### **Q18 What is the World Wide Web?**

Answer – WWW stands for World Wide Web, it is also known as a Web. Web is a collection of websites and a website is a collection of web pages. All websites and webpages are stored in the web server. The Web is a vast network interlinked with each other.

It is made up of

A web page

A web browser

A system to transfer information between the web browser and the web pages

**Q19 What is email?**

Answer – An electronic communication invented in the 1970s to do communication faster, Email is fast and easy to use and it can be sent to multiple people at the same time, Email containing videos, documents, spreadsheets etc. can be sent along with the email as attachments.

**Q20 Differentiate type of email provider?**

Answer – If you want to create an email account, you can follow any one of the provider  
Gmail (run by Google)  
Yahoo mail (run by Yahoo)  
Outlook mail (run by Microsoft)

**Q21 Differentiate between CC & BCC?**

Answer –

- a. **CC** – When you want the email list to be visible to all recipients, and you want to include all the recipients.
- b. **BCC** – When you want to include additional recipients but don't want the recipient to know who else is receiving the email.

**Q21. What are the different types of folders in email?**

Answer – There are different folders that could help you manage and organize your emails.

- a. **Inbox** – By default email is received in the inbox.
- b. **Send** – Send folder store emails that you have sent to other peoples.
- c. **Drafts** – When you are writing an email and you have not sent the email to any other user, that time email will be stored in draft by default.
- d. **Trash** – Trash holds deleted email from the inbox. To delete an email, you select an email and then click on the Delete button for it to be moved from inbox to trash folder

**Q22. What do you mean by ICT?**

Ans. ICT stands for Information and Communication Technology. ICT refers to all the tools related to storing, recording and sending digital information.

**Q23. Differentiate between Hardware and Software ?**

Ans.

Hardware	Software
The physical components that we can see and touch.	It is a set of programs/instructions that perform a specific task
Monitor, Keyboard are examples of Hardware	MS Paint, MS Word are examples of Software.

**Q24. What do you mean by Operating System?**

Ans. Operating System : It is a software that act as an interface between the user and the computer.

**Q25. Give two examples of mobile operating system.**

Ans. Two examples of mobile operating system :

- a. Apple iOS
- b. Google Android

**Q26. Name two operating systems for laptops or desktop.**

Ans. Two operating systems for laptops or desktop are:

- a. Ubuntu
- b. Microsoft Windows

**Q27. Identify me**

- a. I am a physical part of computer.
- b. I am a collection of instruction doing specific task.
- c. I am the software that starts working as soon as we switch on a computer.
- d. I am an input device used to type text, numbers etc
- e. I am a small device that you can use to move, select and open items on your computer screen.

Ans.

- a. Hardware
- b. Software
- c. Operating System
- d. Keyboard
- e. Mouse

**Q28. Expand BIOS?**

Ans. BIOS stands for Basic Input/Output System

**Q29. What do you mean by Input device? Give two examples.**

Ans. Those devices which are used to feed data/command into the computer are called Input device. for example Keyboard and Mouse.

**Q30. What do you mean by drag and drop?**

Ans. Moving an item from one location to another with the help of mouse button. This is called drag and drop.

**Q31. Differentiate between files and folder.**

Ans.

File	Folder
A place where information is stored in computer.	A location where a group of files can be stored.
It has a name and extension both	It has only name.

**Q32. Write the extension for the following.**

- a. A Notepad file
- b. A Sound File
- c. An image file

Ans. Extensions are

- a. .txt
- b. .mp3
- c. .jpg

**Q33. The file name and file name extension are separated by a \_\_\_\_\_**

Ans. dot ( . )

**Q13. Write the steps to create folder on desktop?**

Ans. The steps to create folder on desktop are:

1. Right-click on desktop and then choose the 'New Folder'.
2. Type the name of the folder.

**Q34. Write the shortcut command for the following.**

- a. Cut
- b. Copy
- c. Paste
- d. Undo
- e. Redo
- f. Select all

Ans. Shortcut commands are:

- a. Cut ——— Ctrl + X
- b. Copy ——— Ctrl + C
- c. Paste ——— Ctrl + V
- d. Undo ——— Ctrl + Z
- e. Redo ——— Ctrl + Y
- f. Select all ——— Ctrl + A

**Q35. Write the basic tips for taking care of Laptop/Desktop.**

Ans. Basic tips for taking care of Computer are :

1. Avoid eating anything over a keyboard.
2. Wipe the screen with a soft cloth.
3. Avoid eating or drinking near computer.
4. Handle and move your laptop carefully.

**Q36. What do you mean by Data Backup?**

Ans. Backing up data means to save the information present on your computer on another device, such as CD/DVD drives or hard disk.

**Q37. What do you mean by Spam?**

Ans. We get mails from companies who are advertising a product or trying to attract you to their website. Such mails are called Spam.

**Q38. How can you increase the performance of a computer?**

Ans. We can increase the performance of a computer by

- a. Using an updated Antivirus Software

b. Removing unnecessary files and data, such as temporary files and images.

**Q39. \_\_\_\_\_ is leakage of information stored in a computer.**

Ans. Security break

**Q40 List the various threats to a computer and its data.**

Ans. The various threats to a computer and its data are:

- 1 Virus
2. Phishing
3. Online theft
4. Cyber crime
5. Hacking

## **UNIT 4 - ENTREPRENEURIAL SKILLS**

### **NOTES**

#### **ENTREPRENEUR**

- An entrepreneur is a person who is self-employed, is willing to take a calculated risk and brings in a new idea to start a business.
- It is, however, important to understand that all self-employed persons are not entrepreneurs, for example, a shopkeeper cannot be called an entrepreneur unless he/she introduces a new method or idea in the business.

#### **ENTREPRENEURSHIP**

- The process of developing a business plan, launching and running a business using innovation to meet customer needs and to make a profit is entrepreneurship.

#### **ENTERPRISE**

- An enterprise is a project or undertaking that is bold and fulfils a need of the society which no one has ever addressed.

#### **ROLE OF ENTREPRENEURSHIP**

- Economic Development— Money in Circulation
- Social Development—Creation of Jobs
- Improved Standard of Living— More things available to live a comfortable life
- Optimal Use of Resources
- More Benefits at Lower Prices Products and Services at Competitive Prices

#### **QUALITIES OF A SUCCESSFUL ENTREPRENEUR**

- Patience
- Positivity
- Hardworking, Never Giving Up and Perseverance
- Confidence
- Open to Trial and Error
- Creativity and Innovation

## **BENEFITS OF ENTREPRENEURSHIP**

- Do what you are interested in.
- Work for yourself, and not for others.
- Make profits for yourself.
- More risk, more profit.

## **TYPES OF BUSINESS ACTIVITIES**

There can be three types of business activities:

### **• Product business**

Business where a seller and buyer exchange an item, which can be seen and touched, is called a product-based business. For example, a Sports Shop.

### **• Service business**

Business where a seller helps the buyer to finish some work. For example, a cricket coaching centre.

### **• Hybrid business**

Hybrid is the one where the business is doing both selling product and selling services. For example, starting a sports academy for coaching and selling sports equipment.

## **TYPES OF BUSINESSES IN OUR COMMUNITY**

Businesses can be classified according to **size, legal form, and sector**

### **1) Based on Size:**

**a) Micro Enterprise:** A micro enterprise is a business enterprise where the investment in plant and machinery or equipment is not more than INR 1 crore and turnover does not exceed INR 5 crores.

**b) Small Enterprise:** A small enterprise is a business enterprise where the investment in plant and machinery or equipment is not more than INR 10 crore and turnover does not exceed INR 50 crores.

**c) Medium enterprise:** A medium enterprise is a business enterprise where the investment in plant and machinery or equipment is not more than INR 50 crore and turnover does not exceed INR 250 crores.

### **2) Based on Legal Form:**

#### **a) Sole proprietorship:**

- Ownership and control of the business is with one single person. Liability of the owner is not separate from the entity.

**b) One Person Company:**

- A One Person company also has only one person as a member, who acts in the capacity of both, a shareholder and a director
- OPC is legally separate from its owners.
- There is no threat on the owner's personal property in case of unmet liabilities.

**c) Partnership:**

- Partnership is a legal form, where at least two people, or more start a business as co-founders or co-owners and divide the share as per agreement.
- The partners are personally liable for an unlimited amount of liabilities.

**d) Limited Liability Partnership:**

- There are two or more partners.
- No one single partner or owner is individually responsible for any other partner's or member's negligence or misconduct or liability.

**e) Company:**

- It is defined as a legal entity formed to get engaged in business, by a group of individuals.
- These individuals have limited liability
- The capital in units of equal value of a company are called 'shares'.
- Companies can be public or private.

**3) Based on Sector:**

**a) Primary sector:**

- Primary industry involves getting raw materials from the earth.
- Example mining, agriculture, fishing, horticulture etc.

**b) Secondary sector:**

- The main activity of businesses in this sector is transformation of raw materials into finished goods.
- It takes products from primary sector and organizes all factors of production to make utility as well as luxury products.
- Example making cars

**c) Tertiary sector:**

- This sector is defined by provision of services to businesses and customers.
- It is completely based on a service and there is no production of goods involved

## **CHARACTERISTICS OF ENTREPRENEURSHIP**

### **1. Innovation**

Entrepreneurship is characterised by innovation as it is about using innovation to bring unique solutions to fruition. It involves continuously searching for new ideas, evaluating existing solutions, systems and processes, finding ways to increase efficiency and effectiveness of products and services etc.

### **2. Dynamic Economic Activity**

Entrepreneurship involves creation of value or wealth through a business enterprise. A lot of ambiguity is involved in running a business due to many unknowns or things not going as planned. Due to this, entrepreneurship is considered a dynamic economic activity.

### **3. Risk bearing**

Entrepreneurship is about starting something new, it involves uncertainties and risks. Entrepreneurs have to take risks in implementation of certain decisions and ideas. There are some risks that can be projected by businesses such as supply shortage, increase in cost of raw materials, volatility in market prices, changes in government regulations etc. while there are some risks which cannot be projected such as disasters, pandemics, economic slowdowns etc.

### **4. Potential for Profit**

"Profit potential is the likely level of return or compensation to the entrepreneur for taking on the risk of developing an idea into an actual business venture." For a commercial entrepreneur, profit is usually the main goal. Even for social entrepreneurs, profit might not be the main motive, but a way to sustain the organisation has to be found.

## **ROLE OF ENTREPRENEURSHIP**

### **1) Capital Formation**

Entrepreneurship leads to value addition and creation of wealth, because entrepreneurs promote capital formation by mobilising the idle savings of the public.

### **2) Employment Generation**

There is potential for increase in large-scale employment opportunities with increase in entrepreneurial activity.

### **3) Balanced Regional Development**

Entrepreneurship helps to remove regional disparities through setting up of industries in less developed and backward areas.

#### **4) Value Creation**

Value is created when outputs are more valuable than inputs. Value creation is the foundation of every entrepreneurial activity or business.

#### **5) Wealth Distribution**

Wealth and income are distributed across people and geographies due to entrepreneurship and transaction-based activities. Employees are paid salaries, vendors are paid for their supplies, goods are sold in multiple markets, services are provided at large scale etc.

#### **6) Industrialization and Development**

Establishment of even a single enterprise can lead to the beginning of a new industry. In a specific region, if a business is set up and seen to be a profitable opportunity, it is likely that others will get motivated to set up similar businesses.

### **REWARDS OF ENTREPRENEURSHIP**

#### **1) Economic development**

Some features of economic development include optimal use of resources, creation of new ideas, wealth generation, continuous flow of money, skill building etc.

#### **2) Enterprise and Business Creation**

Business creation is a direct result of entrepreneurship. Many types of enterprises can be created by coordinating and combining different types of resources such as physical, financial, human, intellectual and entrepreneurial skills such as risk taking, innovation, leadership, resource planning etc.

#### **3) Capacity Building**

An entrepreneur develops his/her own capabilities by solving problems, making decisions, embracing failures, experimenting with alternative approaches etc.

#### **4) Improved Standard of Living**

The variety and availability of improved goods and services offered by enterprises leads to higher standards of living.

## **Activities**

### **Activity 1**

#### **Guess the entrepreneur**

Form teams of 5 students each. So, if there are 30 students in class, there would be 6 teams of 5 students in each team and select a leader who will be responsible for running it. Each member in the group will do the following:

- Make a list of all people you see while coming to school and what they are doing.
- Make 2 lists — one of people working for themselves and one of people who work for others.
- Make a list of different kinds of businesses around you.
- Now think of all the items that you cannot buy in your neighbourhood and people have to go far to buy them.
- Do you see this as a possible opportunity for a good business idea?
- How will you innovatively fill this gap?
- Members of the group discuss their ideas within the group.

### **Activity 2**

#### **A successful interview**

- Form pairs of students. One student imagines him/herself to be a successful entrepreneur (maybe 10 years from now).
- The other student will act as an interviewer from a TV channel who will interview this entrepreneur.
- The interviewer asks questions given in the table below and note down the answers.
- One volunteer pair will present their questions and answers to the class.

### **Activity 3**

#### **Product and Services**

- The class is to be divided into 3 teams—product business team, service business team and hybrid business team.
- Each team will get about 15 mins to think of as many examples of product/service/hybrid based businesses. Students will have to think of different types of businesses, rather than just different companies with the same type of business.

## **QUESTION AND ANSWERS**

**Q 1:An inventor of new ideas and business Process is**

- A. Self employed
- B. Scientist
- C. Entrepreneur
- D. Employed

Answer:

- C. Entrepreneur

**Q 2. The process of an individual establishing his Enterprise is**

- A. Team Ship
- B. Entrepreneurship
- C. Friendship
- D. Leadership

Answer:

- B. Entrepreneur

**Q 3. The important characteristic of an Entrepreneur is**

- A. Creativity
- B. Sensibility
- C. Productivity
- D. Ability

Answer:

- A. Creativity

**Q 4. The process of creating something new is**

- A. Creativity
- B. Skill development
- C. Innovation
- D. Dynamism

Answer:

- C. Innovation

**Q 5: Entrepreneurs create \_\_\_\_\_ opportunities, to grow the economy of the country.**

- A. Business
- B. Credit
- C. Money
- D. None of the above

Answer: Business

**Q 6.What are the Characteristics of Entrepreneurship**

- A. Ability to take up risks
- B. Believe in Hard work and discipline
- C. Knowledge of the product and services and their need or demand in the market
- D. All of the above

Answer: All of the above

**Q7. What is Entrepreneurship?**

Answer – An entrepreneur is a person who creates a new business, takes risks, brings new ideas to start a business and is self employed.

### **Q8 What are the different ideas entrepreneurs add?**

Answer – New ideas with which an entrepreneur adds varieties of product, new services, cost reduction ideas, or new marketing etc

### **Q9 What are the qualities of successful entrepreneurs?**

Answer – An entrepreneur needs to have the following qualities –

- a. **Patience** – Success may not be achieved in one-day , it can take time. It is important for an entrepreneur to be patient.
- b. **Positivity** – Always be positive when you are finding difficulty in the business. An entrepreneur has to think positively even when he/she takes a big risk.
- c. **Hard working** – An entrepreneur has to work hard till it becomes successful in the business.
- d. **Confidence** – An entrepreneur has to make decisions and be very confident about their business. An entrepreneur needs to communicate with the customers confidently.
- e. **Open to Trial and Error** – Entrepreneurs have to implement new ideas, implement trial and error and new experiments without fear of failure to tell the business becomes successful.
- f. **Creativity and Innovation** – An entrepreneur should be able to see and identify the problem from different perspectives and come up with creative solutions.

### **Q10 What are the Benefits of entrepreneurship?**

Answer – The various benefits of entrepreneurship are –

1. Work for yourself, and not for others
2. More risk, more profit
3. Do what you are interested in
4. Make profits for yourself

### **Q11 What are the different types of business activities in entrepreneurship?**

Answer – There are three types of business activities in entrepreneurship

- a. **Product business** – If entrepreneurs sell any physical product to the customer which can be seen and touched is called a product business. example grocery item, sport item or electronic item.
- b. **Service business** – If an entrepreneur provides some services to the customers it is called service business. example – caching institute, electronic services shops, call centers etc.
- c. **Hybrid business** – Combination of product and service business is called hybrid business. example – Mobile shop, they provide sell and service both.

**Q12. Bharti is a young woman from Bihar. Many girls in her area like to wear earrings. She buys jute from a farmer and makes earrings from that. Her business is called Manavi Natural Handicrafts. She sees that most women in her village do not work. So, she hires two women to help them.**

**Read the above paragraph and answer the following questions.**

**1) What demand did Bharti identify in her village?**

- (a) People in her village wanted Jute
- (b) Girls in her area liked to wear earrings
- (c) The villagers wanted more water

Ans. (b) Girls in her area liked to wear earrings

**2) What is the local resource that Bharti used?**

- (a) Jute
- (b) Water
- (c) Sand

Ans. (a) Jute

**3) How is Bharti helping her village grow?**

- (a) By buying jute from the local farmer who can now earn more money
- (b) By providing jobs to local women
- (c) Both (a) and (b)

Ans. (c) Both (a) and (b)

**4) How was she creating more jobs?**

- (a) By selling earrings to women without a job
- (b) By buying jute from the local farmer
- (c) By providing jobs to local women

Ans. (c) By providing jobs to local women

**Q13. Write against the option, if the business idea is of self-employment or wage employment.**

(a) Cooking in a restaurant	Wage employment
(b) Owning a clothing business	Self-employment
(c) Having a dosa selling stall	Self-employment
(d) Doctor working in Hospital	Wage employment
(e) Doctor has his/her own clinic	Self-employment

**Q14. What is the difference between a businessman and an entrepreneur**

Businessman	Entrepreneur
<b>Definition</b>	
A businessman is an individual who operates or starts a business with the same old business idea.	An entrepreneur is an individual with an exclusive idea to initiate and establish a new venture
<b>Market state</b>	
Market player	Market leader
<b>Market</b>	
Makes his place in the market	Creates a market

<b>Risk factor</b>	
Less	Approximately high
<b>Procedure</b>	
Traditional/Ordinary	Unconventional
<b>Focus</b>	
Profit	Employee, customer, and public
<b>Competition</b>	
Extremely High	Low

## **UNIT 5 - GREEN SKILLS**

### **NOTES**

#### **NATURAL ENVIRONMENT AND US**

The Natural Environment is a term that collectively refers to all the living beings and nonliving things surrounding us, occurring naturally on earth.

The Natural environment has 2 sub categories

1. Living environment including plants, animals, human beings and other living organisms.
2. Non living environment including oil/rock, air, water and sun.

#### **Types of resources**

The resources are categorized into 3

1. Natural resources
2. Renewable/Non renewable resources
3. Exhaustible/non exhaustible resources

#### **Natural Resources**

Natural resources are freely naturally available supply to us such as land, air, water, sun and so forth. They are freely available on Earth.

Humans depend on natural resources for their survival and also natural resources are depended on one another.

Natural resources come in many forms. It may be a solid, liquid or gas. It may also be organic or inorganic.

It may also be metallic or non-metallic.

- (i) Land Resources
- (ii) Forest Resources
- (iii) Water Resources
- (iv) Mineral Resources
- (v) Food resources
- (vi) Energy resources

#### **Renewable/Non renewable resources**

The natural resources that can be reproduced within a few years or decades Eg: trees, are called renewable resources also called infinite resources.

These are the resources whose used up quantity is replaced on its own as nature is producing them constantly.

Eg : Solar Energy, Water, timber/wood

The natural resources that cannot be reproduced at the rate similar to the rate of their consumption are called non renewable resources.

Eg : Petroleum, coal, natural oil.

## **Exhaustible/Non exhaustible Resources**

Infinitely available resources that the living being of earth can never consume to finish them are known as non-exhaustible resources. Eg solar energy, wind energy

Natural resources that are finite in quantity and recurring use of these is reducing their quantity at a fast rate. Since these have finite quantity they will exhaust one day hence called exhaustible resources.

## **How environment is crucial for us?**

The natural environment around us is the reason for life on Earth. The natural habitat is crucial for life and growth is possible because of the natural resources and natural environment around us.

Eg: life on planet depends on oxygen and water which is provided by the natural environment. Further we breathe the air and produce carbon dioxide, which is balanced by the forests and plant kingdom. The greenery around us not only gives us fresh air, but also makes our environment stress-free.

## **Natural Resource Conservation**

Natural resources can largely be seen as Air, Water, Land (Soil and Forest), Energy. In the prevalent time where pollution levels have risen to the extent of causing health hazards, conservation of these resources is the primary concern. Conservation is the key to the world environmental problems. This means that we need to judiciously use the resources around us and without wasting them.

**Air Conservation:** At largely level, minimizing the release of toxins and green-house gases by the Industries will help us conserve fresh air. Every individual can also contribute in preserving the quality of air by adopting environmental friendly ways. Using public transport or carpooling, use of electric vehicles, vehicles that run on natural gases rather than petrol or diesel, pollution check and maintenance of vehicles at regular interval are few ways in which we can ensure that air pollution is not caused. Use green ways to renovate and construct buildings and houses will also help reduce air pollution.

**Water Conservation:** Scarcity of Water has caused International agencies to act immediately. Wisely using the water is need of the hour. Adopting Rain Water Harvesting Systems in our communities and waste water treatment plants shall contribute in conserving water for future generations. Judiciously using water in our day-to-day life, using water aerators in taps shall also help preserving water. Correspondingly, ensuring that the marine life is not disturbed due to improper waste management will also contribute in preserving quality of water. About 70% of our planet consists of water, and if this water is available to us in impure form, it will be as good as not having any water to support life on Earth.

**Land Conservation:** Conserving land means to act at two levels. First, promoting afforestation and discouraging deforestation for material benefit. This will help promote other life forms to survive and help to maintain balance in the eco system. Second, improving the quality of soil, most of the health concerns today are due to poor quality of food. The landfills and degradation of land and agricultural fields is resulting in poor quality of crops leading to major health concerns. The call of the action is to manage our waste using 4Rs' and 1U – REFUSE, REDUCE, REUSE, RECYCLE and

**UPCYCLE.** Segregating the waste at source should become a part of our life in order to manage waste generation.

**Energy Conservation:** We use a lot of non-renewable sources of energy to fulfil our daily needs. Conservation of Energy means to conserve these resources and use alternative sources of energy to meet our needs such as wind, solar, wave energy. Using these means of energy will promote sustainable living and will ensure that other resources are available for future generation use. Using Air conditioner with doors closed, not keeping the door of refrigerator open for too long, keeping the lights and fans switched off while not in use, using public transport or carpooling etc. are some practices that we can adopt in our daily life to conserve energy

### **Activities that damage our earth and environment.**

Overexploitation

Mining

Deforestation

Pollution

### **Impact of damage to earth and environment**

Climate change

Natural disasters

Harmful radiation

### **Sustainable Development Green Economy**

**Sustainable development :** Sustainable development is defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development, 1987). For example, sustainable agriculture consists of environment friendly methods of farming that allow the production of agricultural crops or livestock without damage to human or natural systems.

### **Sustainable development includes the following:**

- reducing excessive use of resources and enhancing resource conservation.
- recycling and reuse of waste materials.
- scientific management of renewable resources, especially bio-resources.
- planting more trees.
- green grassy patches to be interspersed between concrete buildings.
- using more environment friendly material or biodegradable material.
- use of technologies, which are environmental friendly and based on efficient use of resources.

### **Sustainable Development Goals**

The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The Sustainable Development Goals (SDGs)

were launched at the United Nations Sustainable Development Summit in New York in September 2015, forming the 2030 Agenda for Sustainable Development.

The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) adopted by world leaders in 2015, embody a road map for progress that is sustainable and leaves no one behind.

### **Green Economy :**

Green Economy is concerned with renewable energy, green buildings, clean transportation, water, waste and land management. This would mean that without compromising on the ecological aspects we create options that promote the economy. According to UNEP (United Nations Environment Program) a green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services.

**Green Skills :** The skills used for promoting green economy are known as green skills. Some of the areas

in which green skills contribute to the sustainable development are as follows:

1. using renewable energy (example, using solar power and wind energy)
2. water and waste management
3. rain water harvesting
4. conserving energy
5. reducing pollution

**Green Job :** A 'green job' is employment in any industry that contributes to preserving or restoring environmental quality in that sector and allowing for sustainable development. It includes jobs that help protect ecosystems and biodiversity and reduce energy, materials and water consumption through high efficiency strategies.

**GREEN SKILL DEVELOPMENT PROGRAMME (GSDP).** The programme endeavours to develop green skilled workers having technical knowledge and commitment to sustainable development, which will help in the attainment of the Sustainable Development Goals.

## **Activities :**

### **Activity 1**

#### **Factors influencing the environment**

- Form groups of three students.
- Based on what you learnt about the environment and how different things or actions are effecting the environment, make a list of all factors (things or actions) that affect the environment.
- Think about all the articles you use daily that are made from plastic and answer the following questions
  - (a) How plastic is made?
  - (b) What are those plastic articles you usually use?
  - (c) What effects does plastic have on our environment?
  - (d) How can you reduce the amount of plastic you use?
  - (e) What happens to plastic when you throw it away?
- Discuss these factors in detail. One volunteer group explains their list to the rest of the class who give feedback.

### **Activity 2**

#### **Steps you can take to save the environment**

- Use same groups as above.
- Think about your day from the time you wake up until the time you sleep. In this time, what steps can you take to help save the environment?
- Write a note on the actions that you would take at home or at school to do the following activities:
  - (a) Collecting waste paper and reusing what is reusable (for crafts, papiermache, making rough books, etc.)
  - (b) Encouraging use of both sides of paper.
  - (c) Discouraging wastage and casual use of paper, pencils, etc.
  - (d) Proper use of notebooks and not tearing out pages.
  - (e) Discouraging use of throw away pens and encouraging use of refillable items.
  - (f) Making rough pads with blank sheets from old notebooks.

## QUESTION AND ANSWERS

### Q1 What is soil conservation?

Answer – Soil conservation means improving the soil fertility by adopting various methods.

1. Maintain the soil using natural fertilizers, adding manure and liquid fertilizer make the soil fertility healthy.
2. Grazing should be allowed only on the specified areas.
3. Reforestation on the open space which can reduce soil erosion.
4. Dividing the slope into several flat areas to control the rapid run of water.

### Q2 What is a green economy?

Answer – In 1989 The Government of the United Kingdom introduced the ‘Green Economy’. As per the UNEP definition the green economy one that results in reducing environmental risks, ecological scarcities, improved human well-being, ecological scarcities, and social equity.

### Q3 What are the components of a Green Economy?

Answer – The Green Economy includes the following components.

- Renewable Energy
- Green Building
- Waste Management
- Water Management
- Land Management
- Well – Managed transportation
- 

### Q4 Rain harvesting is a method of :

- a. soil conservation    b. air conservation    c. water conservation d. plant conservation

### Q5 Water conservation

Plants take in \_\_\_\_\_ gas that helps reducing air pollution.

- a. NH<sub>3</sub>    b. H<sub>2</sub>    c. CO<sub>2</sub>    d. NO<sub>2</sub>

### Q6 To protect and conserve the environment we should adopt:

- a. white economy    b. black economy    c. red economy    d. green economy

### Q7 Green Economy

Which of the following is not a natural resource?

- a. coal    b. electricity    c. petroleum    d. soil

### Q8 What is the importance of green economy?

**Answer:**

1. It respects planetary boundaries or ecological limits and scarcity of resources.
2. It helps to protect biodiversity and ecosystems.

3. It is resource and energy efficient and it promotes low carbon emissions.
4. It delivers poverty reduction, human well-being, livelihoods, social protection and access to essential services.

**Q9 Which of the following is a feature of the green economy?**

- a. environment friendly b. save ecosystem c. energy efficient d. all are correct

**Q 10 What are the different natural resources available?**

Answer – Natural resources can be solid, liquid or gas. These resources can be organic, inorganic, metallic or non-metallic.

- a. **Land Resources** – Agricultural, infrastructure development and residential land comes in land resources.
- b. **Forest Resources** – Forest is important to human beings, Some of the resources of forest are timber resources, honey, horns, waxes and insecticides.
- c. **Water resources** – Water covers about 75% of earth surface and is necessary for life. Water resources like – Rivers, oceans, lakes, and underground water.
- d. **Mineral Resources** – Mineral reserves are reducing every year through mining activities. We have to reserve natural resources like petroleum, gas, copper, aluminum, water etc. Naturally mineral resources are in three categories: solid, liquid or gas.
- e. **Food Resources** – Plants serve food for many organisms. resources that are used to make food are called food resources. Agriculture is the main source of food resources.
- f. **Energy Resources** – Heat, Power life or producing electricity is an energy resource.

There are four fundamental sources of energy.

**Q11 What is climate change?**

Answer – Climate change means change in the environmental condition of the earth. Human activities are the largest contribution of climate change and earth temperature by burning fossil fuels, Increasing livestock farming, Fertilizers containing nitrogen and cutting down trees.

**Q12. How does harmful radiation affect climate change?**

Answer – Ozone layer protects earth from harmful radiation from the sun, Ozone layer is made of a gas. Coolants in refrigerators, Air – conditioners and Cleaning chemicals directly affect the Ozone layer.

When ozone layer affects the harmful radiation comes to earth and increases health disorders.

**Q13 . What are natural disasters?**

Answer – Natural disasters depend on climate change, when the climate change earthquakes, floods, storms, landslides etc. affect the earth.

To save the earth and environment we need to educate people about the environment, through the environment and for the environment.

**Q14 How to save the environment?**

Answer – There are three things people need to do to save the environment.

- a. **Reduce** – If you manage waste management properly, if you reduce the use of unnecessary products or items, buy items with minimal packaging, avoid buying plastic bags or plastic products etc.
- b. **Reuse** – Always try to reuse waste products in a different way or reprocessing. For example, making pillow covers you can use old shirts or old ladies suits.
- c. **Recycling** – Reusing some components of the waste that may have some economic value. Paper, Metal, glass and plastics are recyclable. You can recycle the plastic, metal, glass, and paper products.

### **Q15 What is energy conservation?**

Answer – Conservation of energy means saving the energy and using it efficiently. We use a lot of non-renewable energy resources for our needs. we have to save them –

1. Use LED bulbs instead of using Tube light or normal bulbs.
2. Switch off fans, TV, lights and other electrical appliances when it is not used.
3. Using a pressure cooker to make food will save energy.
4. Keep the bulb and tubes clean.

### **. Q16 What is Green growth?**

Answer – Green growth is an approach for achieving economic growth that is socially inclusive and environmentally sustainable.

The Indian Government included Green growth in its vision, where ‘poverty eradication’ and green growth is the focus point of the green economy.

### **Q17 What is a green economy?**

Answer – In 1989 The Government of the United Kingdom introduced the ‘Green Economy’. As per the UNEP definition the green economy one that results in reducing environmental risks, ecological scarcities, improved human well-being, ecological scarcities, and social equity.

### **Q18 What are the components of a Green Economy?**

Answer – The Green Economy includes the following components.

- Renewable Energy
- Green Building
- Waste Management
- Water Management
- Land Management
- Well – Managed transportation

### **Q19 What are Green Jobs?**

Answer – Many companies create jobs to decrease environmental issues due to factories or waste management.

This company required a person to preserve or restore the environment in the natural way that is Green Jobs.

### **Q20 What are the Green Projects?**

Answer – To Save the environment, many organizations are taking initiatives. They are implementing Waste management, Energy conservation, Biofuel use, Green sanitation, Green Building etc.

# **PART B**

## **SUBJECT SPECIFIC SKILL**

# UNIT 1 INTRODUCTION TO AI

## NOTES:

Artificial Intelligence is formed by combining the two words artificial and intelligence.

- a. **Artificial** – Artificial refers to something created or produced by humans rather than existing naturally
- b. **Intelligence** – The ability to acquire and use knowledge and skills is referred to as intelligence.

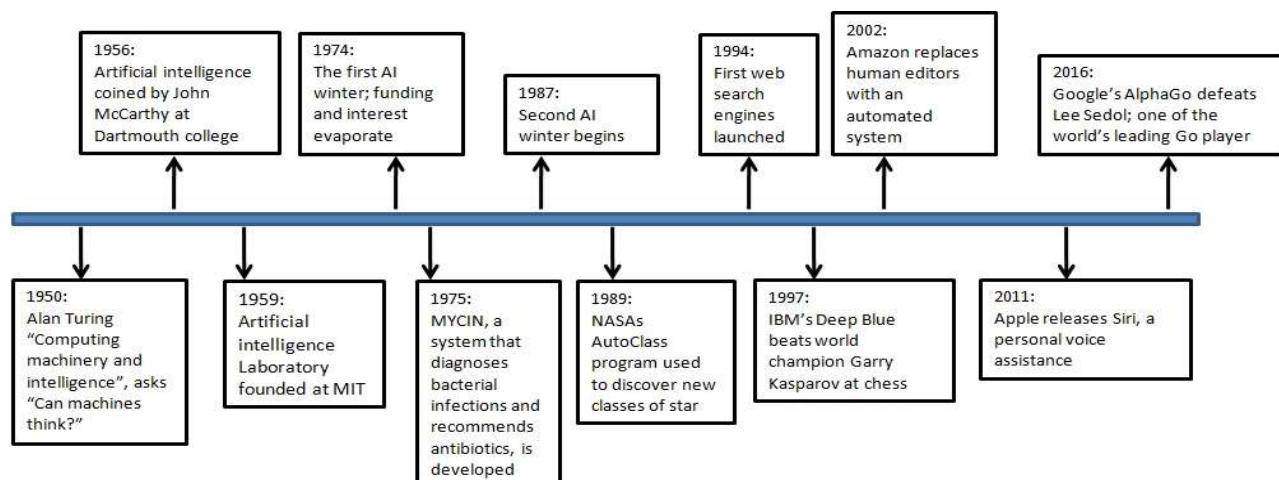
## Artificial Intelligence Definition

Artificial Intelligence (AI) is the ability of machines to do cognitive tasks such as thinking, perceiving, learning, problem solving, and decision making. It is based on how individuals use their brains to observe, learn, figure out, and make decisions.

## History of Artificial Intelligence

Artificial Intelligence formally founded in 1956, when the term “Artificial Intelligence” was coined at a conference at Dartmouth College in Hanover, New Hampshire. The phrase “artificial intelligence” was created by John McCarthy, who also hosted the first AI conference.

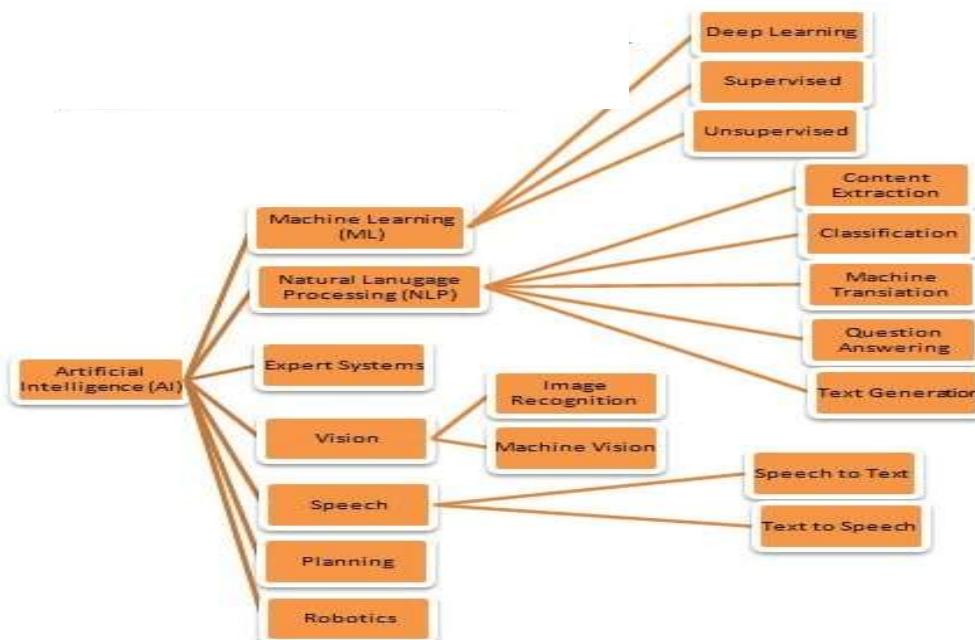
1. **1956** – Birth of AI Dartmouth Conference
2. **1966** – First Chatbot “ELIZA”
3. **1972** – First Intelligence “Robot WABOT – 1”
4. **1974** – 1980 : First AI winer1980 : Expert System
5. **1987** – 1993 : Second AI Winer
6. **1997** – IBM Deep blue “First computer to beat a world chess champion”
7. **2002** – AI in Home “Roomba”
8. **2011** – IBM Watson “Wins a Quiz show”
9. **2012** – Google Introduce AI in there application
10. **2014** – Chatbot Eugene Goostman “Wines a Turing test
11. **2015** – Amazon Echo



## **Role of AI in Education**

The use of technology in education is changing the way we teach and learn all across the world. Artificial Intelligence (AI) is one of the technological innovations that may be used to adapt the learning experience of different learning groups, teachers, and tutors.

The picture below displays some of the most fundamental AI competencies –



### **What is Machine Learning**

Machine learning is a branch of artificial intelligence that allows computers to learn and develop without being explicitly programmed. Machine learning is concerned with the creation of computer program that can access data and learn for themselves. Machine Learning can be used to address difficult problems like detecting credit card fraud, enabling self-driving automobiles, and detecting and recognizing faces.

### **What is Natural Language Processing**

Natural language processing (NLP) is an area of artificial intelligence (AI) that focuses on assisting computers in understanding how humans write and communicate. This is a difficult task because of the large amount of unstructured data involved.

### **What is Expert System**

An expert system is a computer software that can handle complex issues and make decisions in the same way as a human expert can.

### **What is Vision in AI**

Computer vision is a branch of artificial intelligence (AI) that allows computers and systems to extract useful information from digital photos, videos, and other visual inputs, as well as to conduct actions or make recommendations based on that data.

### **What is Speech Recognition in AI**

Voice messages can now be converted to text using this Speech technology. It's also capable of recognizing a person based on their voiced commands.

### **What is Planning in AI**

In Artificial Intelligence, planning refers to the decision-making duties carried out by robots or computer programmes in order to attain a given goal.

### **What is Robotics**

Robotics is the production of robots that can do activities without the need of human interaction, whereas AI is the process of systems imitating the human mind to make judgments and 'learn.'

## **Applications of Artificial Intelligence**

### **AI Application in E Commerce**

- a. **Personalized Shopping** – Artificial Intelligence (AI) is used to develop recommendation engines that help you engage with your customers more effectively. These suggestions are based on their previous browsing behavior, preferences, and interests.
- b. **AI-powered Assistants** – Virtual shopping assistants and chatbots aid in the enhancement of the online buying experience.
- c. **Fraud Prevention** – Two of the most serious difficulties that E-Commerce businesses face are credit card fraud and fraudulent reviews.

### **Artificial Intelligence in Automobiles**

Self-driving automobiles are built using artificial intelligence. To drive the vehicle, AI can be combined with the camera, radar, cloud services, GPS, and control signals.

### **Artificial Intelligence in Social Media**

Many of the social media sites use a AI technology in Social Media

- a. **Facebook** – Artificial Intelligence uses the technique known as DeepText. DeepText automatically translates the post from one language to another language.
- b. **Twitter** – Twitter uses AI for fraud detection, propaganda removal, and to remove hateful content.

### **Artificial Intelligence in Agriculture**

With the help of AI the farmer can identify defects and nutrient deficiencies in the soil with the help of machine learning applications

### **Artificial Intelligence in Robotics**

Another industry where artificial intelligence applications are widely used is robotics. AI-powered robots use real-time updates to detect obstructions in their path and instantaneously arrange their route.

#### **1. Google Search**

Google Search has been the go-to search engine to look for all sorts of stuff. Google introduced some of the AI elements to improve the ranking of websites

## 2. Google Duplex and Hold For Me

[Google Duplex](#) is another AI-based service that is truly leveraging the full potential of AI. In 2018, Google demonstrated Duplex which could book a table at restaurants on your behalf. It **mimics human voice and understands context** and replies naturally just like any other human being. Apart from that, [Hold For Me](#) is a new addition to Pixel phones in the US. It's another example of AI in our daily life that makes day-to-day tasks so much hassle-free.

## 3. Smart Compose, Quick Reply, and Grammar Check

If you use Gmail then you might have noticed a new feature called [Smart Compose](#). It suggests complete sentences based on the preceding line that you have written. It uses Artificial Intelligence to quickly compose your **email drafts with contextual accuracy** and correct grammar.

## 4. Google Recorder, Live Captions, and Transcribe

One of the best uses of AI is happening in speech detection. Google has also brought [Live Caption](#) on Android and Chrome browser. It can listen to internal audio and **offer live caption in real-time**.

## 5. Google Lens and OCR

Google Lens is another Google service that is built on AI and has some great technology for fast and accurate optical recognition. It allows you to search for anything through images. Just **point the camera to a shoe or a plant** or an animal or a text, it can detect the type of subject and will provide precise information on that thing in just a few seconds.

## 6. Image Editing — Remove Background & Enhance Resolution

AI is also being extensively used in image editing. remove.bg ([visit](#)) is one of the popular websites to **remove the background** of an image through AI.

## 7. Fall Detection and Car Crash Detection

Newer Apple Watches come with a Fall Detection feature that alerts the nearby emergency team when it **senses you had a hard fall**

## 8. Smart Cars and Drones

Talking about AI, there is no better and more prominent display of this technology than what smart car and drone manufacturers are doing with it. Just a few years back, using a fully automatic car was a dream, however, now companies like Tesla have made so much progress that we already have a fleet of semi-automatic cars on the road.

## 9. Social Media Feeds, Amazon, and Netflix Recommendations

**if you are using social media, most of your decisions are being impacted by artificial intelligence. From the feeds that you see in your timeline to the notifications that you receive from these apps, everything is curated by AI.** AI takes

all your past behaviour, web searches, interactions, and everything else that you do when you are on these websites and tailors the experience just for you

## **10. Music and Media Streaming Services**

Another great example of how AI impacts our lives are the music and media streaming services like Netflix that we are using on a daily basis. **Whether you are using Spotify or YouTube, AI is making the decisions for you.**

## **11. Smart Home Devices**

We are even willingly letting artificial intelligence in our houses. Many of the smart home devices that we buy **use artificial intelligence to learn our behaviour so that they can adjust the settings themselves** to make the experience as frictionless as possible for us.

## **12. Security and Surveillance**

. With technologies like object recognition and facial recognition getting better and better every day, it won't be long when all the security camera feeds are being monitored by an AI and not a human. While there's still time before AI can be fully implemented, this is going to be our future.

### **Three Domains of Artificial Intelligence**

There are three types of domain in Artificial Intelligence.

1. Data Science (Data for AI)
2. Natural Language Processing (NLP)
3. Computer Vision (CV)

#### **1. Data Science (Data for AI) –**

The process of converting a raw dataset into valuable knowledge is known as Data Science. Nowadays Data Science is an important part of an Industry. Data science is an AI domain concerned with data systems and processes, in which the system collects a large amount of data, maintains sets of data, and extracts meaning from them.

AI Games related to Data Science

#### **Rock, Paper, Scissors AI Game (Based on Data Science)**

Rock, Paper, Scissors is an easy game to play. Each player chooses one of the three things (typically by creating the appropriate hand shape on three counts!) and the following rules are used to determine who won that round:

- Paper wraps (beats) Rock
- Scissors cut (beat) Paper
- Rock blunts (beats) Scissors

The purpose of the game is to guess your opponent's choice and select the proper object to defeat them.

#### **Game link (Play in computer)**

<https://rps-ai-game.herokuapp.com>

## **2. Natural Language Processing (NLP)**

Natural language processing (NLP) is a branch of artificial intelligence. Natural language Processing has the ability to understand text and spoken words in the same manner that humans can.

AI Games related to Natural language Processing (NLP)

- Akinator with alexa AI Game (Based on Natural Language Processing)
- Akinator is a free Amazon Echo app that uses a series of questions to figure out which character you're thinking of.
- You can ask the app to guess the identity of a real or imaginary individual.
- 

### **Game link (Play in mobile phone)**

[https://play.google.com/store/apps/details?id=com.digidust.elokence.akinator.freemium&hl=en\\_IN&gl=US](https://play.google.com/store/apps/details?id=com.digidust.elokence.akinator.freemium&hl=en_IN&gl=US)

## **3. Computer Vision (CV)**

Computer vision allows computers and systems to extract useful information from digital photos, videos, and other visual inputs. The goal of Computer Vision is to take necessary action after identifying an object or person in a digital image.

AI Games related to Computer Vision

### **Emoji Scavenger Hunt (Based on Computer Vision)**

Emoji Scavenger Hunt is a project that uses neural networks and your phone's camera to detect real-world counterparts of the emoticons we use on a daily basis.

#### **Game link**

Website link – <https://emojiscavengerhunt.withgoogle.com/>

### **Reverse Image Search (Based on Computer Vision)**

Google's picture search is presently only available on desktop computers. If a friend has sent an image to you on WhatsApp or Facebook that you want to verify, you'll need to first copy the image to a desktop and then run a reverse image search.

#### **Website link –**

<https://www.labnol.org/reverse/>

## **SKILLS REQUIRED FOR THE JOBS OF AI**

There are a various number of skills required for AI related Jobs

- Required Training to become an expertise in the field of Artificial Intelligence
- Good knowledge of Math and Science related to AI
- Required Programming Languages like Python, Java, Web related language etc
- Linear algebra and statistics
- Signal processing techniques
- Neural network architectures

## **Career Opportunities in Artificial Intelligence**

1. Data Analytics
2. Natural Language Processing
3. Robotic Scientist
4. Research Scientist
5. Researcher
6. Software Engineer
7. AI Engineer
8. Data Mining and Analysis
9. Data Scientist
10. Machine Learning Engineer
11. Business Intelligence Developer
12. Big Data Engineer/ Architect

## **Top Companies in Artificial Intelligence**

1. Google
2. Apple
3. Amazon
4. FaceBook
5. Anki
6. DJI
7. Deepmind
8. Clarifai
9. Casetext
10. DataVisor

## **AI ETHICS**

AI ethics is a set of moral guidelines and methods meant to guide the creation and ethical application of artificial intelligence technologies. Or it is a collection of principles that guide the development and use of artificial intelligence.

- In other words, ethics means what is right and unethical means what is wrong.
- AI ethics are classified into two categories:
  1. AI bias
  2. AI access

### **AI Bias**

When outcomes in AI cannot be broadly generalized, bias occurs. We frequently imagine bias as the product of preferences or exclusions in training data, but bias can also be introduced through the methods used to collect data, the algorithms used to process it, and the methods used to interpret the results of AI.

### **AI Access**

Not everyone can use artificial intelligence because it is still a developing technology. People who can afford AI-enabled technology benefit from it to the fullest, while those who cannot are left behind. Due to this, a gap between these two social strata has developed, and it is becoming wider due to the rapid growth of technology.

### **Why AI Ethics is important?**

Ethical AI can help businesses run more efficiently, provide cleaner products, reduce negative environmental impacts, improve public safety, and improve human health.

### **Ethical Challenges in Artificial Intelligence**

1. Cost to Innovation
2. Lack of quality data
3. Problems of Integrity
4. Lack of accuracy of data
5. Bias and discrimination
6. Reduction of human contact
7. Violation of fundamental human rights in supply chain
8. Negative impact on environment
9. Loss of human decision-making

### **APPLICATIONS OF AI**

- Healthcare - disease mapping and prediction tools, robotic surgeries
- Transportation – self parking cars, crewless cargo ships
- Agriculture - drone robots for intelligent spraying , automatic weeding
- Education – automated assessments, ease admin tasks
- e-Commerce – conversational chatbots, recommendation systems
- Entertainment - song / TV show recommendations, robo-waiters
- Automotive – driverless car
- Social Media – monitoring tools for dangerous content or false news
- Security – bomb diffusion
- Finance – robo-advisers for stock trading
- Gaming - Watson, a quiz playing computer, tournaments where robots are trained to compete
- Astronomy – planet hunting, capturing new stars etc.

### **Applications of AI**

#### **1.AI Application in E Commerce**

##### **a. Personalized Shopping :-**

Artificial Intelligence (AI) is used to develop recommendation engines that help you engage with your customers more

effectively. These suggestions are based on their previous browsing behavior, preferences, and interests.

b. AI-powered Assistants:-

Virtual shopping assistants and chatbots aid in the enhancement of the online buying experience.

C. Fraud Prevention:-

Two of the most serious difficulties that E-Commerce businesses face are credit card fraud and fraudulent reviews.

**2.Artificial Intelligence in Automobiles**

Self-driving automobiles are built using artificial intelligence. To drive the vehicle, AI can be combined with the camera, radar, cloud services, GPS, and control signals.

**3.Artificial Intelligence in social media**

Many of the social media sites use AI technology in social media

- a. Facebook – Artificial Intelligence uses the technique known as Deep Text. Deep Text automatically translates the post from one language to another language.
- b. Twitter – Twitter uses AI for fraud detection, propaganda removal, and to remove hateful content.

**4.Artificial Intelligence in Agriculture**

With the help of AI the farmer can identify defects and nutrient deficiencies in the soil with the help of machine learning applications

**5.Artificial Intelligence in Robotics**

Another industry where artificial intelligence applications are widely used is robotics. AI-powered robots use real-time updates to detect obstructions in their path and instantaneously arrange their route

**QUESTION AND ANSWERS**

**MCQ**

1. \_\_\_\_\_ is the ability of machines to do cognitive tasks such as thinking, perceiving, learning, problem solving, and decision making.

a. Artificial Intelligence

b. Nero Science

c. Data package

d. None of the above

2. Who is the "Father of Artificial Intelligence"?

a. Fisher Ada

b. Alan Turing

**c. John McCarthy**

d. Allen Newell

3. Artificial Intelligence's applications are \_\_\_\_\_.  
a. Expert Systems  
b. Gaming  
c. Vision Systems  
**d. All of the above**
4. This field is enabling computers to identify and process images like humans do:  
a. Face Recognition  
b. Model-view-controller  
**c. Computer Vision**  
d. Eye-in-Hand System
5. What does NLP stand for in AI?  
a. Neutral Learning Projection  
b. Neuro-Linguistic Programming  
**c. Natural Language Processing**  
d. Neural Logic Presentation
6. This is a program that allows the computer to simulate conversation with a human being:  
a. Speech Application Program Interface  
**b. Chatbot**  
c. Voice Recognition  
d. Speech Recognition
7. \_\_\_\_\_ is a branch of artificial intelligence that allows computers to learn and develop without being explicitly programmed.  
**a. Machine Learning**  
b. Natural Language Processing  
c. Expert System  
d. Computer Vision
8. \_\_\_\_\_ is a computer software that can handle complex issues and make decisions in the same way as a human can.  
a. Machine Learning  
b. Natural Language Processing  
**c. Expert System**  
d. Computer Vision
9. \_\_\_\_\_ aid in the enhancement of the online buying experience.  
a. Virtual Shopping Assistants  
b. Chatbots  
**c. Both a) and b)**  
d. None of the above
10. With the help of AI the farmer can identify defects and nutrient deficiencies in the soil with the help of \_\_\_\_\_.  
**a. machine learning applications**  
b. Natural Language Processing  
c. Expert System  
d. Computer Vision

11. Which one is the correct domain available in Artificial Intelligence.
- a. Data Science
  - b. Natural Language Processing
  - c. Computer Vision
  - d. **All of the above**
12. The process of converting a raw dataset into valuable knowledge is known as
- a. Data Science**
- b. Natural Language Processing
  - c. Computer Vision
  - d. All of the above
13. \_\_\_\_\_ is an AI game based on data science.
- a. Rock, Paper, Scissors**
- b. Akinator with alexa
  - c. Emoji Scavenger
  - d. None of the above
14. \_\_\_\_\_ is a free Amazon Echo app that uses a series of questions to figure out which character you're thinking of
- a. Rock, Paper, Scissors
  - b. Akinator with alexa**
  - c. Emoji Scavenger
  - d. None of the above
15. \_\_\_\_\_ allows computers and systems to extract useful information from digital photos, videos, and other visual inputs.
- a. Data Science
  - b. Natural Language Processing
  - c. Computer Vision**
  - d. All of the above
16. \_\_\_\_\_ is a web-based service that provides accurate data on geographic regions and locations all over the world.
- a. Google Bot
  - b. Google Map**
  - c. Google Class
  - d. None of the above
17. A \_\_\_\_\_ is a flexible house setup in which appliances and devices may be managed remotely using a mobile or other networked device from anywhere with an internet connection.
- a. Smart Home**
  - b. Smart City
  - c. Smart Class
  - d. None of the above

18. Match column A with Column B.

Column A	Column B
1.Expert System	A. Simulate how a human would behave as a conversational partner
2. Chatbot	B. Uses knowledge stored in a knowledge base but requires the intervention of human expert
3.Digital Assistant	C. Autonomous vehicle
4. self-driving car	D. Works on various mobile platforms

- a) 1 -> B; 2 -> A; 3 -> D; 4 -> C
- b) 1 -> A; 2 -> B; 3 -> C; 4 -> D
- c) 1 -> D; 2 -> A; 3 -> B; 4 -> C
- d) 1 -> C; 2 -> A; 3 -> D; 4 -> B

19. An application lets you search what you see, get things done faster and understand the world around you – using just your camera or a photo. Which domain does this app belong to?

- a) Natural Language Processing
- b) Data Sciences
- c) **Computer Vision**
- d) Artificial Language Processing

20. Choose the AI applications among the ones given below:

- i) Gmail uses Smart Compose feature can help you type emails faster as it offers suggestions for words and phrases as you type.
  - ii) Websites make use of a software that simulates human-like conversations with users via text messages on chat.
  - iii) Soap dispensers use infrared sensors with which when hands are placed in the proximity of the sensor, dispense the designated amount of soap.
  - iv) Face recognition technology that identifies and verifies a person using the person's facial features and automatically marks attendance.
- a) i), ii) and iv)
  - b) i), ii) and iii)
  - c) ii), iii) and iv)
  - d) **i), iii) and iv)**

### **Short answer Questions**

1. what are the typical benefits of chatbots for a business?

**2. Is AI a recent technology? If no, explain why it has gained prominence only recently.**

**3. What is Artificial Intelligence?**

**4. What are the various areas where Artificial Intelligence can be used?**

**5. What do you mean by Machine Learning?**

**6. What is Computer Vision?**

7. Give any three example of Artificial Intelligence Domain?

**8. What are the different Real World Application in AI?**

9. What is Chatbot? How AI used in Chatbot?

10. How AI is helping to search travelling path and traffic data through maps?

11. Explain AI ethics in detail

12. Explain application of AI in e Commerce

### **3 Marks Questions**

1. Information about three games are given below. Identify the game and the respective domain

1. The players of this game have to guess what the opponents will choose and make an appropriate shape to defeat them.

2. This is a simple twenty questions game in which the player can ask 20 Yes/No questions to identify the animal.

3. In this game, the computer asks the player to find the objects that match certain images within a time limit.

a) 1. Emoji Scavenger Hunt -> Computer vision; 2. Rock, Paper, Scissor -> Natural Language Processing; Mystery Animal -> Data Sciences

b) 1. Mystery Animal -> Data Sciences; 2. Emoji Scavenger Hunt -> Natural Language Processing; 3. Rock, Paper, Scissor -> Computer vision

c) 1. Rock, Paper, Scissor -> Data Sciences; 2. Emoji Scavenger Hunt -> Natural Language Processing; 3. Mystery Animal -> Computer vision

d) 1. Rock, Paper, Scissor -> Data Sciences; 2. Mystery Animal -> Natural Language Processing; 3. Emoji Scavenger Hunt -> Computer vision

2. Choose the AI applications among the ones given below:

i) Gmail uses Smart Compose feature can help you type emails faster as it offers suggestions for words and phrases as you type.

ii) Websites make use of a software that simulates human-like conversations with users via text messages on chat.

iii) Soap dispensers use infrared sensors with which when hands are placed in the proximity of the sensor, dispense the designated amount of soap.

iv) Face recognition technology that identifies and verifies a person using the person's facial features and automatically marks attendance.

- a) i), ii) and iv) b) i), ii) and iii) c) ii), iii) and iv) d) i), iii) and iv)

### **Descriptive Questions**

1. **What are four core things that is used by Turing Test ?**
2. **Write any four goals of AI.**
3. **What are the three domains of AI?**
4. **Why AI work is more successful in the expert Tasks Domain?**
5. **What is an Expert System? What are the characteristics of an expert system?**
6. **What are the different types of AI based functionalities and capabilities?**
7. **What is AI? Give Example of Where AI is used on a daily basis.**

## UNIT 2 AI PROJECT CYCLE

### NOTES:

#### What is AI Project Cycle?

- AI Project Cycle is a step-by-step process that a company must follow in order to derive value from an AI project and to solve the problem
- The objective is to distribute the development of AI project in various stages so that the development becomes easier, clearly understandable and the steps / stages become specific to efficiently get the best possible output.
- It mainly has 5 ordered stages which distribute the entire development in specific and clear steps. These are Problem Scoping, Data Acquisition, Data Exploration, Modelling and Evaluation.



#### Stage 1 : Problem Scoping

Problem Scoping aims to scope the problem that you wish to solve with the help of your project. Basically it involves

- Understanding why the project was started
- Defining the project's primary objectives
- Outlining the project's work statement

#### Stage 2 : Data Acquisition

Data Acquisition, also known as Data Collection is a process of collecting data from various sources for the purpose of building the system

- Data has to be accurate and reliable to ensure the efficiency of the system
- Hence it is of paramount interest that data is collected only from reliable and authorized sources
- Data can be in any format like numbers, text, images etc. It is important to collect the data as per the system requirement

#### Stage 3 : Data Exploration

Data Exploration is a process of arranging the collected data into a form that can be analysed or through which some meaningful information can be derived. For this

- Raw data has to be converted to a useful format
- It has to be arranged and stored in a systematic manner
- Basically make the data appropriate for analysis

#### Stage 4 : Modelling

- An AI model is a program that has been trained to recognize patterns using a set of data.

- AI modelling is the process of creating algorithms, also known as models, that may be educated to produce intelligent results.
- This is the process of programming code to create a system artificially.

#### Stage 5 : Evaluation

- After a model has been created and trained, it must be thoroughly tested in order to determine its efficiency and performance. This is known as evaluation.
- The model that gives the most efficient and reliable result is chosen for deployment

## **PROBLEM SCOPING IN AI**

In the problem scoping stage, broadly the aim and scope of the project undertaken are decided.

#### **4 W CANVAS**

The 4 W Canvas helps one deduce a clear definition of the problem statement by identifying four crucial factors:

1. Who – Who are the ones for which the solution is to be developed; the stakeholders. The stakeholders are the directly or indirectly affected people who are facing the problem and will benefit from the solution.
2. What –What is the nature of the problem
3. Where – Where does the problem arise
4. Why – Why this problem should be solved and how it will benefit the stakeholders.

Problem statement: A problem statement is a short, clear description of the problem listing its stakeholders, their issue(s), context and reasons to solve the problem. It gives the overview of the problem in a nutshell.

## **DATA ACQUISITION**

#### **Introduction**

Data acquisition is the second step in the AI project cycle and it plays vital role for the success of any AI project. Data Acquisition is the process of collecting accurate and reliable data to work with. So, we should ensure the data is collected from authentic and reliable sources for effective Decision Making.

Data can be a piece of information or facts collected together for reference or analysis. Whenever we want an AI project to able to predict an output, we need to train it first using data-training data set.

#### **Data Features**

Data features refer to the type of data we want to collect for an AI system. For this, we need to visualize the factors which affect the problem statement and also we need to extract Data features for the problem scoped. Now we have to find out what are the parameters which affect our problem statement directly or indirectly and list them down.

## **Training data Vs Testing Data**

The data collected through the system is known as training data. In otherwords, the input given by the user in the system can be considered as training data whereas the result data set or processed data is known as testing data. In other words, the output of the data is known as testing data.

For better efficiency of an AI project, the training data should be authentic and relevant to the problem statement scoped.

## **Selection of Data source**

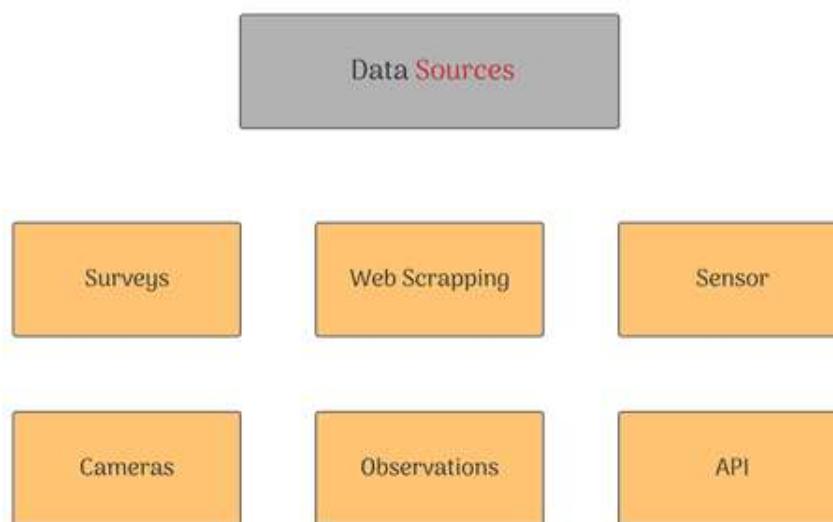
It is important to find reliable data as data is the foundation of all AI projects. After finding out the data features, we need to acquire the same. There exist various sources from which data can be acquired. Data plays an important role in an AI project as it creates the base on which the AI project is built. Therefore, the acquired data should be authentic, reliable and correct. Also the acquisition methods should be authentic so that the project will not conflict with anyone.

Sometimes we use internet and try to acquire data for our AI project from some random website. Such data might not be authentic as its accuracy cannot be proved unless proper sources are mentioned. Thus it becomes necessary to find a reliable source from where authentic information can be taken. Extracting private data can be an offence. Europe has strict law against it called General Data protection Rights (GDPR).

One of the most reliable and authentic sources information is the open source website hosted by the government. These government portals have general information collected in suitable format which can be downloaded and used wisely. Some of the open source government portals are:

[www.data.gov.in](http://www.data.gov.in)

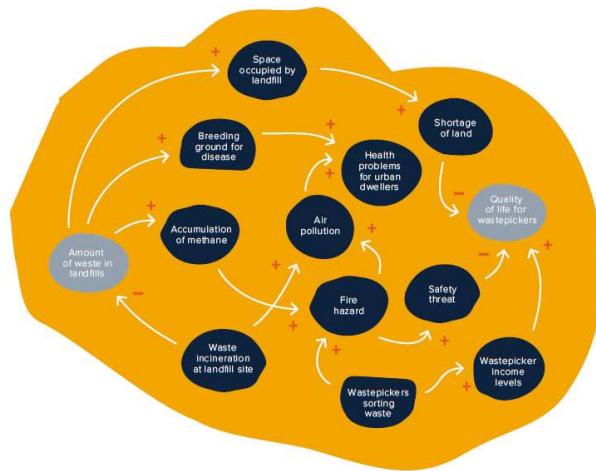
[www.india.gov.in](http://www.india.gov.in)



## System Maps

A System map help us in finding relationship between different elements of the problem which we have scoped. It helps us in strategizing the solutions for achieving the goal of our project.

For example, a system map for the waste problem in Mumbai is given below:



## QUESTION AND ANSWERS

1. In \_\_\_\_\_ stage, the developed model is actually evaluated for accuracy and performance using new data so as to determine if the developed model is deployable or not
  - a. problem scoping
  - b. data acquisition
  - c. data exploration
  - d. Modelling
  - e. Evaluation
- Ans. (e)
2. Choose the five stages of AI project cycle in correct order from the choices given below
  - a. Evaluation → Problem scoping → Data exploration → Data acquisition → Modelling
  - b. Problem scoping → Data exploration → Data acquisition → Evaluation → Modelling
  - c. Data acquisition → Problem scoping → Data exploration → Modelling → Evaluation
  - d. Problem scoping → Data acquisition → Data exploration → Evaluation → Modelling
- Ans (d)
3. Which of the following would you study in the problem scoping stage of an AI project?

- a. Domain and parameters specific to the problem
- b. Data specific to the problem
- c. Data required for testing
- d. Algorithm and solution specific to the problem

Ans. (a)

4. The new district collector has decided to use AI based smart technology for waste collection. In order to proceed with it, they decided to identify the areas of installation of smart bins using drones. This is being done during the \_\_\_\_\_ stage of AI project cycle.
- a. Modelling
  - b. Data Exploration
  - c. Problem Scoping
  - d. Data Acquisition

Ans. (c)

5. Under which block of 4 Ws problem Canvas, you also gather evidence to prove that the problem you have selected actually exists?
- a. What
  - b. Why
  - c. Where
  - d. Who

Ans (a)

6. These days we are pretty habituated of home delivery system through e-commerce platform, however there is a big dependency on delivery boys and vehicles for timely delivery of the items. We, MIDA Logistics, could potentially use drones for last mile delivery of items. While current prevalent addressing mechanism such as latitude / longitude and post code are good enough for humans, these wont work for drone delivery as all houses in a multi storey building will have same latitude / longitude or post code. Design a solution which can help drones to identify each address / flat / apartment as a separate unit and deliver the item accordingly to the destined receiver.

- a. Identify the stakeholders from the given problem statement
  - i. The destined receiver
  - ii. MIDA Logistics
  - iii. The Drones
  - iv. All of the above

Ans. (b)

- b. Identify the problem being solved from the given problem statement
  - i. Identifying the building
  - ii. Deliver the item to the destined receiver
  - iii. Reaching the address
  - iv. All of the above

Ans. (b)

- c. Identify the location of the problem
  - i. The building
  - ii. One building with multiple apartments
  - iii. The apartment
  - iv. All of the above

Ans. (b)

- d. Identify the reason of solving the problem
- Using drones for delivering
  - Navigating to the building
  - To identify each address / flat / apartment as a separate unit
  - All of the above

Ans. (c)

7. Fill in the blanks (1 mark each)

- Data for an AI project can be collected through....., ..... and .....
- Data acquired in a project should be ....., ..... and .....

Answers:

- Surveys, Web scraping and Sensors.
- Authentic, reliable and correct.

8. State True or False(1 Mark Each)

- System maps help us to find relationship between different elements of the problem which we have scoped.
- Data features refer to the type of data you want to collect.

Answers:

- True
- True

9. MCQs(1 Mark Each)

- Which is the second stage of AI project cycle
- Evaluation      b. Data Acquisition    c. Problem Scoping    d. Modeling

Answer: (b)

### Answer the following (2/3 marks)

1. Explain the DOIT principle of setting actions around the goal of your project.

Answer:

To set actions around the goal DOIT principle may be used as:

Describe the pain points

Outline multiple possible solution alternatives

Identify consequences of each alternative

Take the best possible alternative.

2. What is the significance of Goal Setting in problem scoping phase?

Ans. Goal Setting sets the scope of the project and thereby clearly defines the boundary of the project and tasks to be covered in it.

3. What is a problem statement template and what is its significance? (3 Marks )

The problem statement template gives a clear idea about the basic framework required to achieve the goal by identifying the right problem to solve and to understand it perfectly. Problem statement template helps us to explore a problem from various angles and bring clarity about the problem to be solved.

4. Explain how you think system maps are useful in defining the workflow in AI project cycle. (2 Marks)

5. Differentiate Training data and Testing Data. (3 Marks)

In machine learning, datasets are split into two subsets.

The first subset is known as the training data - it's a portion of our actual dataset that is fed into the machine learning model to discover and learn patterns. In this way, it trains our model.

Training data is typically larger than testing data. This is because we want to feed the model with as much data as possible to find and learn meaningful patterns. Once data from our datasets are fed to a machine learning algorithm, it learns patterns from the data and makes decisions.

6. What do you mean by data features? (3 Marks)

7. What is the importance of data features in a project? Taking the example of predicting the weather, what all data features will you use? (4 marks)

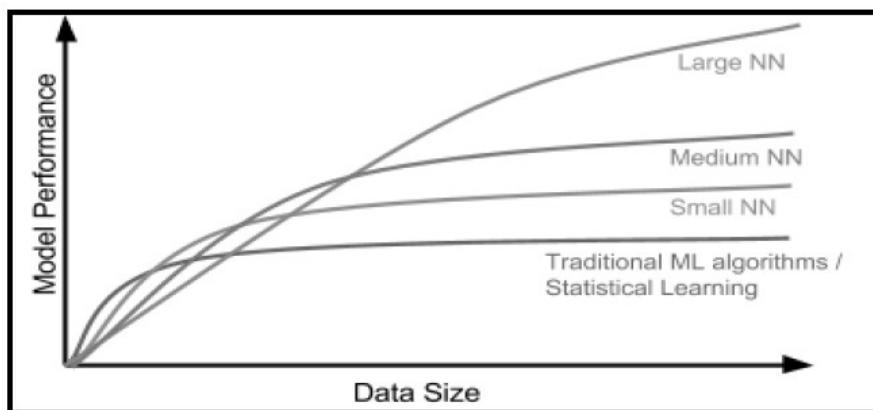
## UNIT 3 NEURAL NETWORKS

### NOTES

#### NEURAL NETWORK

The neural networks are the model that how neurons in the human brain behave. It is also known trained as ANN(Artificial Neural Network) that copy the working of the human brain neurons or cells inside the computers. The greatest thing of ANN is it can extract the features of data without any programming or input. The computer can learn, recognise, and make decisions like human beings.

The neural network works on machine learning algorithms to fulfil the need of the user or perform the task. It basically used to solve the problems for large dataset.



#### APPLICATION OF NEURAL NETWORK

Some of the applications of neural networks are :

- Speech recognition
- Character recognition
- Spell checking

**ARTIFICIAL NEURAL NETWORKS (ANN)** :- An Artificial Neural Network (ANN) refers to a collection of connected computational units or nodes (called neurons) along with biologically inspired computer programs designed to simulate the way in which the natural neural networks of human brain process information.

## HOW NATURAL NEURAL NETWORKS WORK?

A human brain is a network of neurons where parts of each neuron play an important role.

**A neuron has three major components.**

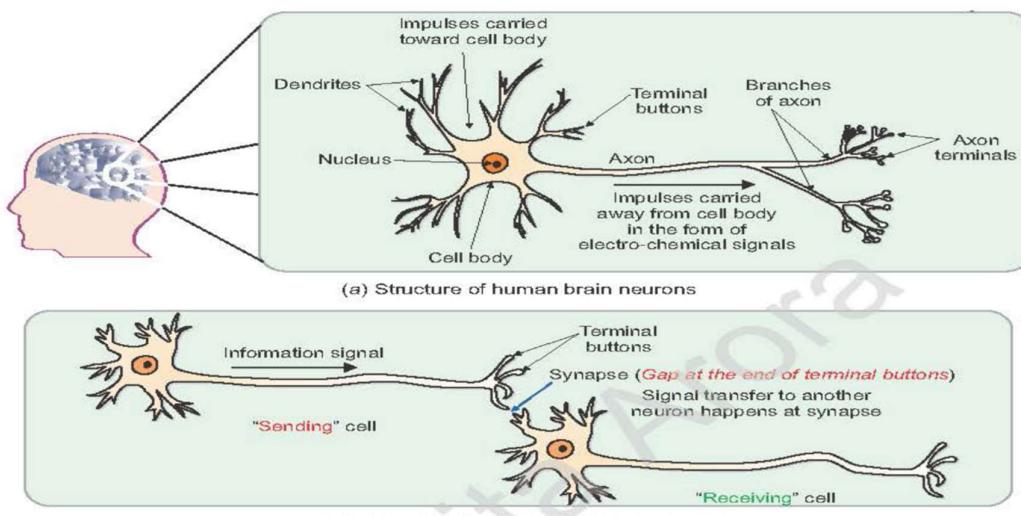
**Dendrites** :- are tree like receptive networks of nerve fibers that carry electrical signals into the cell body.

**Soma / Cell Body** :- It is a cell body that contains nucleus, and sums and thresholds all incoming signals.

**Axons & Axon Terminals** :- The axon is a long fiber that carries signal from the cell body out to other neurons.

**Synapse** :- The point of contact between an axon of one cell and a dendrite of another cell is called a synapse.

Figures 6.1(a), (b) show the structure and working of human brain neurons.



## ARTIFICIAL NEURAL NETWORKS (ANN)

**The Components of An Artificial Neural Network (ANN) are :**

**Neuron** :- equivalent of neuron (also called node or neurode).

**Weighted inputs** :- equivalent to dendrites.

**Activation function** :- equivalent to soma (It defines how the weighted sum of the inputs is transformed into an output from a node or nodes in a layer of the network)

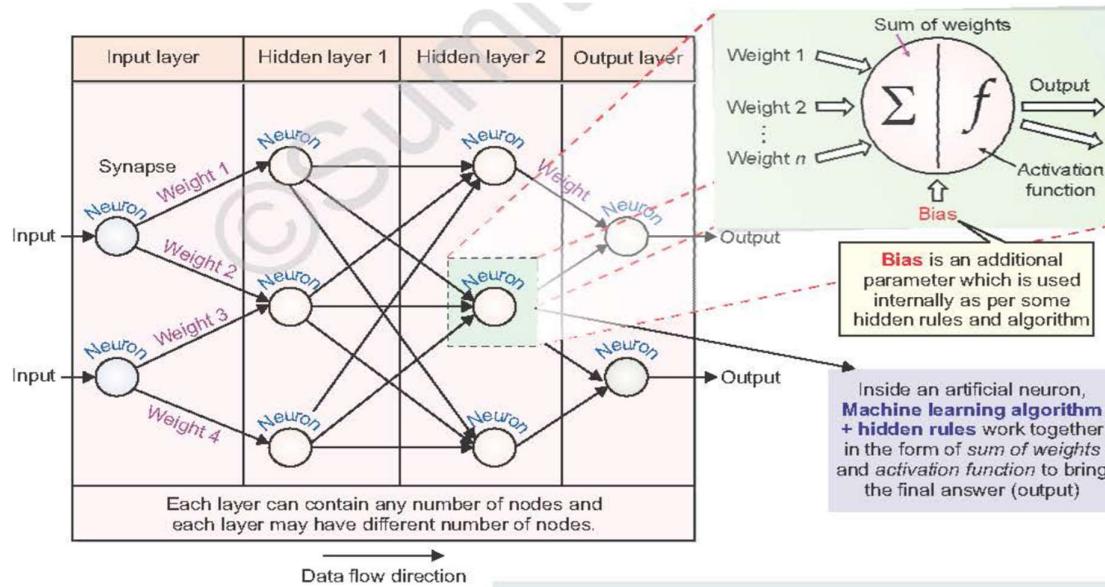
**Synapse** :- Connection from a neuron to another that carry the information.

**Axon** :- Output

**Bias** :- is an additional parameter in the Neural Network which is used internally as per some hidden rules and algorithm to adjust the output along with the weighted sum of the inputs to the neuron.

## STRUCTURE OF ANN

A Neural Network is divided into multiple layers. Each layer of an ANN consist of several artificial neurons are called nodes. Each node has to perform a specific task and pass the information to the next layer.



### How Neural Networks(NN) learn

There are three ways neural networks work.

1. **Supervised Learning** is where a computer algorithm is trained on input data that has been labelled for a particular output .
2. **Unsupervised Learning** is in which a system learn through data-sets created by its own. In unsupervised is not labelled.
3. **Reinforcement Learning** Learning through feed-back or trial and error method is called Reinforcement learning.

### QUESTIONS & ANSWERS

#### MCQ ( 1 mark )

1. \_\_\_\_\_ are modelled on the human brain, it is essentially a machine learning algorithm, useful for solving problems when the dataset is large.
  - Computer Vision
  - Data Science
  - Natural Language Processing
  - Neural Network.

**ANS : Neural Network**

2. The full form of ANN is \_\_\_\_\_.
  - A. AI Neural Networks.
  - B. Artificial Neural Node.
  - C. Artificial Neural Numbers
  - D. Artificial Neural Networks.

**ANS : Artificial Neural Networks**

3. What are the three main part of a Neuron
  - A. Dendrite, Axon, Aoma.
  - B. Gamio, Samio, Dendrition.
  - C. Dendrite, Soma, Axon.
  - D. Dendrite, Axon, Soma.
4. In an ANN, the adjustable parameter on each connection that scales the data passing through it, is called \_\_\_\_\_.
  - A. Soma
  - B. Synapse
  - C. Weight.
  - D. Axon.

**ANS :**

5. Which layer performs computation in a multilayer perception?
  - A. Input nodes
  - B. Hidden nodes
  - C. Auxiliary nodes.
  - D. Fibre node.

**ANS : Hidden nodes**

### **Short Answer /Long Answer ( 2/3 mark)**

#### **1. What is algorithm?**

**Answer –** A machine learning algorithm is a series of instructions that allows a computer programme to replicate how a human learns to classify different types of data.

#### **2. Type of learning algorithm?**

**Answer –** There are three type of learning algorithm.

- a. Supervised Learning
- b. Unsupervised Learning
- c. Reinforcement Learning

#### **3. What is supervised learning?**

**Answer –** Supervised learning is a method of artificial intelligence development that involves training a computer algorithm on labelled input data for a specific output.

#### **4. What is unsupervised learning?**

**Answer –** Unsupervised learning is the use of artificial intelligence (AI) systems to detect patterns in data sets that contain data points that are neither categorized nor labelled.

#### **5. What is reinforcement learning?**

**Answer –** Through reinforcement learning, an intelligent agent interacts with the environment and learns to operate within it.

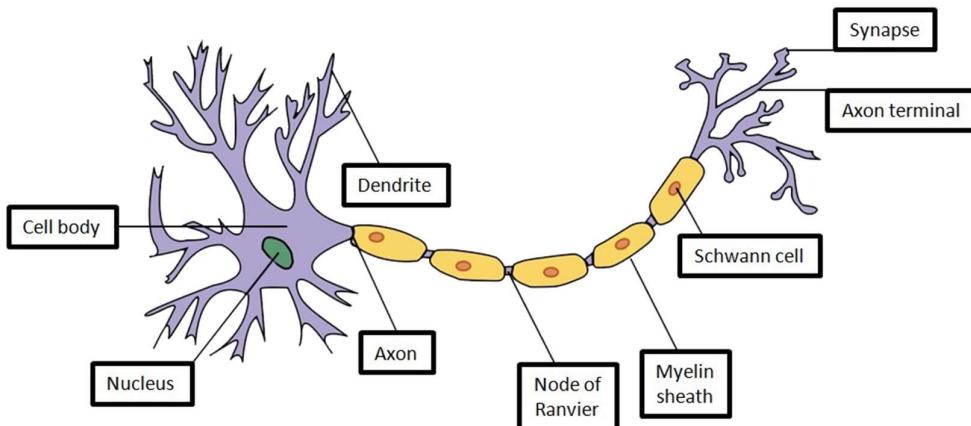
#### **6. What are the future of Neural network?**

**Answer –** The future of Neural network are –

- a. Neural network systems are modelled using the human brain and nervous system.
- b. They can extract features without the input of the programmer.
- c. A neural network's nodes are all machine learning algorithms.
- d. It comes in handy when dealing with problems involving a huge data set.

#### **7. Explain the structure of human neuron and ANN**

**Answer –**



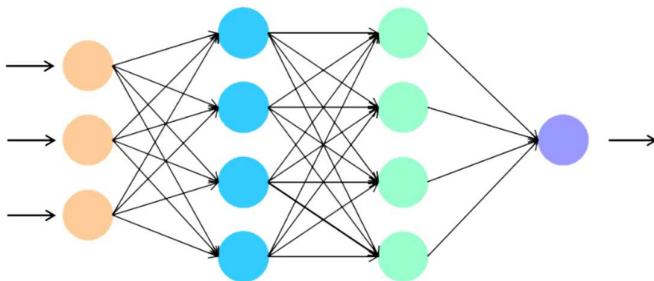
Major components of human neuron are:

**Dendrites** :- are tree like receptive networks of nerve fibers that carry electrical signals into the cell body.

**Soma / Cell Body** :- It is a cell body that contains nucleus, and sums and thresholds all incoming signals.

**Axons & Axon Terminals** :- The axon is along fiber that carries signal from the cell body out to other neurons.

**Synapse** :- The point of contact between an axon of one cell and a dendrite of another cell is called a synapse



Major  
Input

Input  
layer

Hidden  
layer 1

Hidden  
layer 2

Output  
layer

components of ANN are:  
layer – It communicates with

external environment that present a pattern to the neural network. Its job is to deal with all the inputs only. This input get transferred to the hidden layer

Hidden layer – These are intermediate layers between input and output layer that helps the neral network to learn the complicated relationships involved in data.

Output layer – It collects and transmits the information accordingly in a way it has been designed to give. The final output is extracted from the previous hidden layers.

#### 8. What do you mean by Perceptron?

**Answer** - A perceptron also called an **artificial neuron** is a neural network unit that does certain computations to detect features.

It is a single-layer neural network used as a linear classifier while working with a set of input data. Since perceptron uses classified data points which are already labeled, it is a **supervised learning algorithm**. This algorithm is used to enable neurons to learn and process elements in the training set one at a time.

#### 9. What is the difference between Forward propagation and Backward Propagation in Neural Networks?

**Answer-**

**Forward propagation:** The input is fed into the network. In each layer, there is a specific activation function and between layers, there are weights that represent the connection strength of the neurons. The input runs through the individual layers of the network, which ultimately generates an output.

**Backward propagation:** an error function measures how accurate the output of the network is. To improve the output, the weights have to be optimized. The backpropagation algorithm is used to determine how the individual weights have to be adjusted. The weights are adjusted during the gradient descent method.

### **COMPETENCY BASED QUESTIONS**

6. An online proofreading tool is very popular for automatic contract reviews. It is designed for attorneys, notaries, and other professionals who deal with multiple legal documents daily. The user uploads a document in PDF, word or plain text file, and in less than a minute is able to read a summary report. This proofreading tool uses a neural network. What type of data, do you think, it'd be trained on?
  - A. Lots of image.
  - B. Lot of Characters.
  - C. Lots of professional documents.
  - D. Lots of documents.

7. Twitter now has a new feature that helps one pick tweets that are likely to drive the most engagement. This new feature is ANN based and it evaluates each tweet in real time (as soon as it is posted) and “scores” them according to various factors. This helps it identify tweets which will be popular among readers and they be more engaged with these tweets. What type of training dataset is used for this ANN?
- A. All the tweets of Twitter.
  - B. The popular and most engaged tweets
  - C. A sample set of Tweets.
  - D. A sample of keywords for tweets.
8. An ANN is being trained to predict whether a user will click on an ad or not. The input data set contains huge number of advertisement and labelled user information. For each type of advertisement, there is an expected output also available, which is one of these: click(1) or not click (0). For each output produced, the ANN is given a response about if the output produced matched the expected output or not. What type of learning is being used for ANN's training?
- A. Supervised Learning
  - B. Unsupervised Learning.
  - C. Reinforcement Learning.
  - D. Semi-supervised Learning.
9. What is a neural network in the context of computing?  
ANS : An Artificial Neural Network (ANN) refers to a collection of connected computational units or nodes (called neurons) along with biologically inspired computer programs designed to simulate the way in which the natural neural networks of human brain process information.
10. How does a Neural Network work?  
ANS : In a neural network, information transfers from input layer nodes to connected layer(s), which after required processing and decision-making, reach to the final layer as output. Neural networks are initially trained with some input data and then they keep learning with very new input and feedback.

## UNIT 4 INTRODUCTION TO PYTHON

### NOTES

Python is a popular programming language. Python is an open source, object oriented, High Level Programming Language. It was created by Guido van Rossum, and released in 1991.

Python is based on the ABC and Modula-3 languages and the name was inspired by the famous BBC comedy show “Monty Python’s Flying Circus”.

It is used for:

- web development
- software development
- Business Applications
- mathematics
- system scripting.
- Desktop and GUI applications

### Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.
- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

### Features of Python

Python is an interactive, interpreted language with simple syntax. It has become increasingly popular because of its features which are listed below

- Easy
- Expressive
- Free and Open Source
- High Level
- Portable
- Object Oriented
- Interpreted
- Large Standard Library
- GUI Programming
- Less Learning time
- Dynamically typed

## **Limitations of Python**

- ❖ Not the fastest language
- ❖ Lesser Libraries than C, Java, Perl
- ❖ Not Strong on Type-binding
- ❖ Not Easily convertible
- ❖ Not a very good language for mobile computing

## **Working in Python**

Before we start working on Python we need to install Python in our computer. There are multiple distributions available today:

- ❖ Default Installation available from [www.python.org](http://www.python.org) is called Cpython installation and comes with python interpreter, Python IDLE(Python GUI) and Pip(package installer)
- ❖ ANACONDA Python distribution is one such highly recommended distribution that comes with preloaded many packages and libraries(NumPy, SciPy, Panda etc)
- ❖ Other Popular IDEs like Spyder, PyCharm, etc. Spyder IDE is available as a part of ANACONDA.

After Python installation we can start working with python. In Python we can work in 2 ways:

1. Interactive Mode (Immediate Mode)
2. Script Mode

**To work in interactive mode, follow the process given below:**

(i) Click start button -> All Programs à Python 3.6.x ->IDLE or

Click start button -> All Programs à Python 3.6.x ->Python

(command line)

- ❖ Interactive modes – one command at a time
- ❖ Python executes the given command and gives the output.
- ❖ In interactive mode we type command at IDLE prompt ( >>> )

## **Working in Script Mode(Python IDLE)**

- ❖ Script Mode – multiple commands can be saved in a file as a program and then we can execute the entire program
- ❖ Type Python program in a file and then use the interpreter to execute the content from the file.

- ❖ Working in interactive mode is convenient for beginners and for testing small pieces of code, as we can test them immediately. But for coding more than few lines, we should always save our code so that we may modify and reuse the code

## **VARIABLES**

Variables are the named places to hold some values in a program. A computer program uses variables to hold values. These values can be changed when needed

In Python a variable is created the moment you first assign a value to it.

```
x = 5  
y = "John"  
print(x) #5  
print(y) #John
```

## **Constants**

A constant is a type of variable whose value cannot be changed. It is helpful to think of constants as containers that hold information which cannot be changed later. Non technically, you can think of constant as a shoe box with a fixed size of shoe kept inside which cannot be changed after that.

## **DATA TYPES**

Data type in Python specifies the type of data we are going to store in any variable, the amount of memory it will take and type of operation we can perform on a variable. Data can be of many types e.g. character, integer, real, string etc.

### **Python supports following data types:**

- Numbers ( int, float, complex)
- String
- List
- Tuple
- Dictionary

### **1.NUMBERS**

From the name it is very clear the Number data types are used to store numeric values. Numbers in Python can be of following types

#### A. Integers

- a) Integers(signed)
- b) Booleans

#### B. Floating point numbers

#### C. Complex Numbers

## INTEGERS

An integer allows storing whole numbers only and there is no fraction part.  
Integers can be positive and negative e.g. 100, 250, -12, +50

There are two integers in Python:

- 1) **Integers** (signed) :it is normal integer representation of whole numbers. Integers in python can be of any length, it is only limited by memory available. In Python 3.x int data type can be used to store big or small integer value whether it is +ve or -ve.
- 2) **Booleans**: it allows to store only two values True and False. The internal value of boolean value True and False is 1 and 0 resp. We can get Boolean value from 0 and 1 using bool() function.

```
>>>bool(1) True  
>>>int(False) 0
```

## FLOATING POINT NUMBERS

It allows to store numbers with decimal points. For e.g. 2.14. The decimal point indicates that it is not an integer but a float value. 100 is an integer but 100.5 is a float value.

## COMPLEX NUMBERS

Python represents complex numbers in the form A+Bj. To represent imaginary numbers, Python uses j or J in place of i.

e.g.

```
a = 0 + 6j  
b = 2.5 + 3J  
>>>a=4+5j  
>>>print(a) # (4+5j)  
>>>b=0+2j  
>>>b #(2j)
```

Python allows to retrieve real and imaginary part of complex number using attributes: **real** and **imag**

If the complex number is a then we can write **a.real** or **a.imag**

### Example

```
>>>a=1+3.54j  
>>>print(a.real) # 1.0  
>>>print(a.imag) # 3.54
```

## 2. None

This is special data type with single value. It is used to signify the absence of value/false in a situation. It is represented by None.

### 3. Sequence

A sequence is an ordered collection of items, indexed by positive integers. It is a combination of mutable and non-mutable data types. Three types of sequence data type available in Python are:

- a) Strings
- b) Lists
- c) Tuples

#### String

String is an ordered sequence of letters/characters. They are enclosed in single quotes (' ') or double (" "). The quotes are not part of string. They only tell the computer where the string constant begins and ends. They can have any character or sign, including space in them. **Example:** "Kerala"

#### Lists

List is also a sequence of values of any type. Values in the list are called elements / items. These are indexed/ordered. List is enclosed in square brackets.

**Example:** dob = [19, "January", 1990]

#### Tuples

Tuples are a sequence of values of any type, and are indexed by integers. They are immutable. Tuples are enclosed in () .

#### Example:

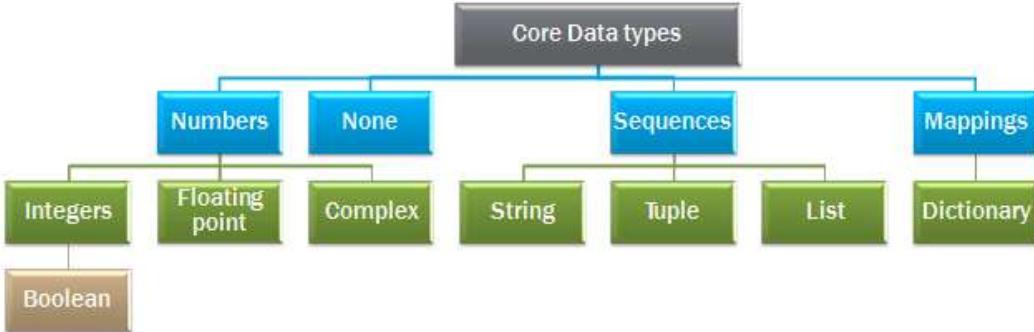
t = (5,'program',2.5)

#### Dictionary

Dictionary is another feature of Python. It is an unordered set of commaseparated key:value pairs. Dictionary Items are defined in Curly Brackets {}

Keys defined in Dictionary cannot be same i.e. no two keys can be same.

```
>>> student={'Roll':1,'Name':'Jagga','Per':91.5}
>>>print(student)
>>> print(student['Per'])
91.5
```



## **QUESTIONS AND ANSWERS**

1. When and who developed Python?

Ans. Guido Van Rossum developed Python programming language in 1991

2. What are the two different ways to work with Python? State the difference between the two ways.

Ans. In Python, one can work in two different ways :

- a) Interactive mode --- instruction is given in front of python prompt(>>>) and it is executed and shows the result there itself.
- b) Script mode --- Python instructions are stored in a file with .py extension and are executed together in one go as a unit .

3. What are the disadvantages of Python?

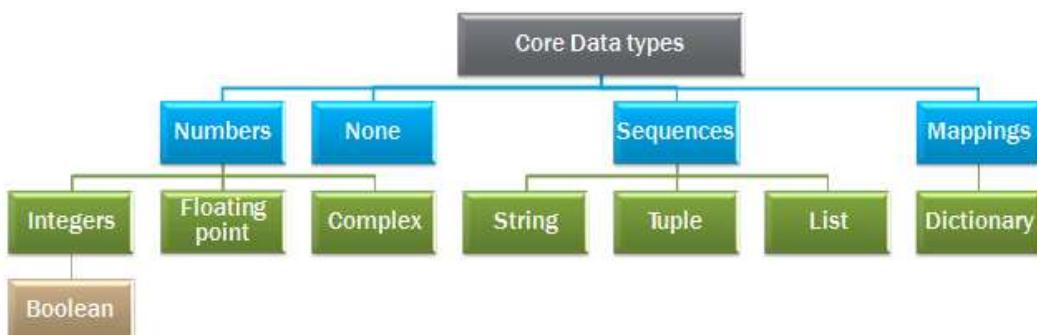
Ans.

- ❖ Not the fastest language
- ❖ Lesser Libraries than C, Java, Perl
- ❖ Not Strong on Type-binding
- ❖ Not Easily convertible
- ❖ Not a very good language for mobile computing

4. What is variable ?

Ans. Variables are the named places to hold some values in a program.

5. List the datatypes used in Python. (3)



- a. Numbers
  - i. Integer
  - ii. Floating Point
  - iii. Complex
- b. None
- c. Sequence
  - i. String
  - ii. Tuple
  - iii. List
- d. Dictionary

6. Explain different features of Python?

Ans. Python is an interactive, interpreted language with simple syntax. It has become increasingly popular because of its features which are listed below

- Expressive
- Free and Open Source
- High Level
- Portable
- Object Oriented
- Interpreted
- Large Standard Library
- GUI Programming
- Less Learning time
- Dynamically typed

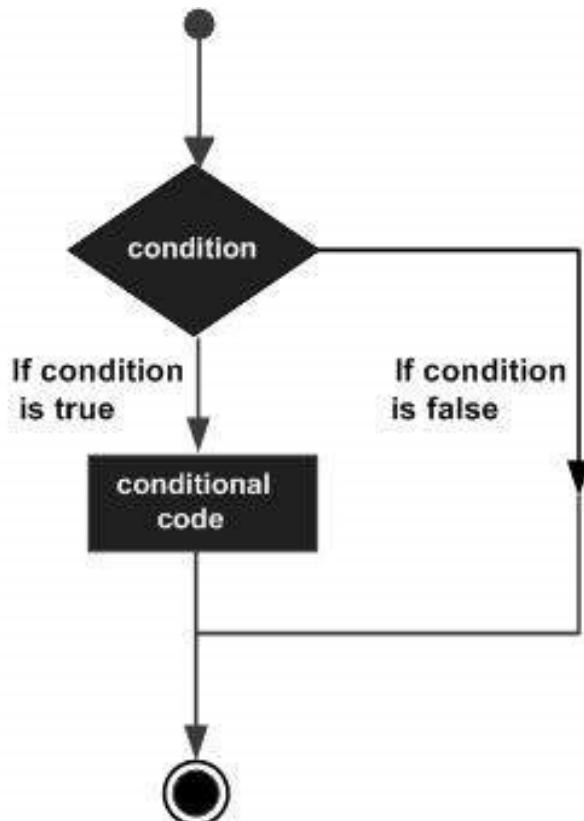
## Flow Control Statements

There are three control flow statements in Python – if, for and while.

## Decision-Making Statements

Decision-making is creating conditions for evaluation. Decision structures evaluate multiple expressions which produce TRUE or FALSE as output. The statements which we need to perform when the condition is true is written in true block and the statements which we need to perform when the condition is false is written in false block.

Following is the general form of a typical decision-making structure found in most of the programming languages:



Python programming language assumes any non-zero and non-null values as TRUE, and if it is either zero or null, then it is assumed as FALSE value.

Python programming language provides following types of decision-making statements.

1. if statement
2. if..else statements
3. if-elif ladder

## **1. If Statement**

The if statement is used to test a condition: if the condition is true, a set of statements is executed (called the if-block).

Syntax:

if test expression:

statement(s)

Example:

```
a = 5
```

```
if (a < 10):
```

```
print ("5 is less than 10")
```

```
print ("Statement after if statement")
```

Output:

```
5 is less than 10
```

```
Statement after if statement
```

Note:

- 1) In Python, the body of the if statement is indicated by the indentation. Body starts with an indentation and the first unindented line marks the end.
- 2) Python interprets non-zero values as True. None and 0 are interpreted as False.

## **2. If...else statement**

The if/else statement is a control flow statement that allows you to run a block of code only if a set of conditions are satisfied.

Syntax:

if test expression:

Body of if

else:

Body of else

Example:

```
i = 20;
```

```
if (i < 15):
```

```
print ("i is smaller than 15")
```

```
else:
```

```
print ("i is greater than 15")
```

```
print ("Statement after if statement")
```

Output:

i is greater than 15  
statement after if statement

### **3. if-elif ladder**

Elif stands for “else if.” It enables us to check for several expressions at the same time. If the if condition is False, the next elif block’s condition is checked, and so on. The body of else is executed if all of the conditions are False.

Syntax:

```
if test expression:  
    Body of if  
elif test expression:  
    Body of elif  
else:  
    Body of else
```

Example:

```
a = 50  
if (a == 20):  
    print ("value of variable a is 20")  
elif (a == 30):  
    print ("value of variable a is 30")  
elif (a == 40):  
    print ("value of variable a is 40")  
else:  
    print ("value of variable a is greater than 40")
```

Output:

value of variable a is greater than 40

### **Nested if statements**

An if...elif...else sentence can be nestled inside another if...elif...else statement. In computer programming, this is referred to as nesting.

Example:

```
a = 20  
if (a == 20):  
    # First if statement  
    if (a < 25):  
        print ("a is smaller than 25")  
    else:  
        print ("a is greater than 25")  
else:  
    print ("a is not equal to 20")
```

Output:

## **Loops:**

Loops allow us to repeat certain parts of the code multiple times until the given condition is satisfied, without having to rewrite that piece of code.

### **For Loop**

The for statement allows you to specify how many times a statement or compound statement should be repeated. A for statement's body is executed one or more times until an optional condition is met.

range() is a very useful function that returns a series of numbers in iterable form. Thus, it can be used in for loop.

#### **Syntax:**

```
for val in sequence:
```

```
    Body of for
```

#### **Example:**

```
# Program to find the sum of all numbers stored in a list
# List of numbers
numbers = [6, 5, 3, 8, 4, 2, 5, 4, 11]
# variable to store the sum
sum = 0
# iterate over the list
for val in numbers:
    sum = sum+val
# Output: The sum is 48
print("The sum is", sum)
```

#### **Output:**

The sum is 48

## **While loop**

The while statement allows you to repeatedly execute a block of statements as long as a condition is true. A while statement is an example of what is called a looping statement. A while statement can have an optional else clause.

#### **Syntax:**

```
while test_expression:
```

Example:

```
# Program to add natural
# numbers upto
# sum = 1+2+3+...+n
# To take input from the user,
# n = int(input("Enter n: "))
n = 10
# initialize sum and counter
sum = 0
i = 1
while i <= n:
    sum = sum + i
    i = i+1 # update counter
# print the sum
print("The sum is", sum)
```

Output:

Enter n: 10

The sum is 55

In the above program, the test expression will be True as long as our counter variable *i* is less than or equal to *n* (10 in our program). We need to increase the value of the counter variable in the body of the loop. This is very important (and mostly forgotten). Failing to do so will result in an infinite loop (never ending loop).

### **Question and Answers**

1. Instructions written in the source code for execution are called \_\_\_\_\_. (1)

- a. Statements
- b. Sentence
- c. Both a) and b)
- d. None of the above

Ans) a. Statements

2. Write a python program to find the largest number among the three input numbers. (3)

Ans)

```
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
num3 = float(input("Enter third number: "))
if (num1 >= num2) and (num1 >= num3):
    largest = num1
elif (num2 >= num1) and (num2 >= num3):
    largest = num2
else:
    largest = num3
print("The largest number is", largest)
```

3. \_\_\_\_\_ keyword is used to add an alternative condition to an 'if' statement.

(1)

Ans) elif

4. Describe while loop with an example? (4)

Ans) While loop

The while statement allows you to repeatedly execute a block of statements as long as a condition is true. A while statement is an example of what is called a looping statement. A while statement can have an optional else clause.

Syntax:

```
while test_expression:
```

```
    Body of while
```

Example:

```
# Program to add natural
# numbers upto
# sum = 1+2+3+...+n
# To take input from the user,
# n = int(input("Enter n: "))
n = 10
# initialize sum and counter
sum = 0
i = 1
while i <= n:
    sum = sum + i
    i = i+1 # update counter
# print the sum
print("The sum is", sum)
```

Output:

```
Enter n: 10
```

```
The sum is 55
```

In the above program, the test expression will be True as long as our counter variable *i* is less than or equal to *n* (10 in our program). We need to increase the value of the counter variable in the body of the loop. This is very important (and mostly forgotten). Failing to do so will result in an infinite loop (never ending loop).

5. Write a python program to check whether a person is eligible to vote or not (2)

Ans)

```
age = int(input("Enter Age : "))
# condition to check voting eligibility
if age>=18:
    status="Eligible"
else:
    status="Not Eligible"
print("You are ",status," for Vote.")
```

Output  
Enter Age : 19  
You are Eligible for Vote.

## **LIST IN PYTHON**

Python lists are containers that are used to store a list of values of any type. It is possible to change the elements of a list. Python list is a sequence of values stored in a specific order. The order can be identified by the index number in that order.

Here are some examples of lists in Python

[]	List with no member / Empty list
[10,4,5]	A list with integers (all the list items belongs to same datatype)
[1,5,5.5,9.8]	A list with integers and floating point datatype
['a','b','c']	A list of characters
['India','Japan','China']	A list of strings

### **How to create a list in Python?**

A list can be created by putting a number of expressions in square brackets. The items are separated by commas

```
L1= [100,300,50]  
fruits=['Apple','Orange','Grapes']
```

### **How to print the elements of a list ?**

The elements of a list can be printed by typing the list name in on the prompt. It can also be printed by using the print()

Example

```
>>>cars=['Swift','SUV','Sedan','Wagon']  
>>>cars
```

```
[‘Swift’, ‘SUV’, ‘Sedan’, ‘Wagon’]
```

```
>>>print(cars)  
[‘Swift’, ‘SUV’, ‘Sedan’, ‘Wagon’]
```

### How to create an empty list ?

An empty list can be created by the following expression

```
l=list()
```

### Nested lists

A list can be an element of another list

```
L1=[200,300,[600,700]]
```

There are three elements in the above list L1

*L1[0] is 200*

*L1[1] is 300*

*L[2] is [600,700]*

### Checking the length of a list.

The length or size of a list means the number of elements of a list.

To check the number of elements of a list **len()** is used

Example

```
>>> list1=[1,2,3,4,10]
```

```
>>>len(list1)
```

5

**type()**

The **type()** will display the type of list when used with a listname .

```
>>>list2=[‘a’,’b’,’c’]
```

```
>>>type(list2)
```

<class ‘list’>

### Indexing and Accessing the elements of a list

#### Positive indexing

Python lists items are numbered as 0,1,2,3 ..... .This is positive indexing .

The first element is having index number 0

The second element has index number 1

.....

.....

The last element has index number length-1.

That means if there is 5 items in a list the last elements index number will be 4

### **Negative indexing**

Python elements have negative indexing along with positive indexing

The last element's negative index number will be -1

The second last element's negative index number will be -2

The first element's index number will be equal to the -(length) of the list.

For example if there is 5 elements in a list the negative index of the first element will be -5

List elements can be accessed by the following statements

Listname[index number]

Example

```
>>>Mylist1=[100,200,300,400]
```

```
>>>mylist1[0]
```

100

The first element will be displayed .( This is Positive indexing )

```
>>>mylist1[-1]
```

400

Here negative indexing is used . The last element will be displayed .

### **How to add an item to an existing list?**

To add an item to an existing list append(<newitem>) is used.

```
>>>list1=[10,20,30,100]
```

```
>>>list.append(2000)
```

```
>>>mylist
```

```
[10,20,30,100,2000]
```

2000 is added as the last element of the list

### **How to modify an element in a list**

An element can be changed or modified by assigned a new value to the accessing name

<listname>[index number]=<new item>

Example

Team=[“anjana”,’meera’,’seetha’]

To add a new element ‘souparnika’ to the list instead of ‘meera’

Team[1]=’souparnika’

>>>Team

[‘anjana’,’souparnika’,’seetha’]

## PYTHON PROGRAMS – SET I

### 1) Python Program to display the given string into lower case & upper case

```
a = "Hello, World!"  
print(a.lower())  
print(a.upper())
```

#### Output:

```
hello, world!  
HELLO, WORLD!
```

### 2) Python program to find sum of two numbers

```
num1 = 10  
num2 = 20  
# finding sum  
sum = num1 + num2  
# printing sum  
print("sum of ", num1, " and ", num2, " is = ", sum)  
# taking input from user  
num1 = input("Enter first number: ")  
num2 = input("Enter second number: ")  
# finding sum  
sum = int(num1) + int(num2)  
# printing sum  
print("sum of ", num1, " and ", num2, " is = ", sum)
```

sum of 10 and 20 is = 30  
Enter first number: 100  
Enter second number: 200  
sum of 100 and 200 is = 300

### 3) Python program to swap two variables

```
x = 5  
y = 10  
# To take inputs from the user  
#x = input('Enter value of x: ')  
#y = input('Enter value of y: ')  
# create a temporary variable and swap the values  
temp = x  
x = y  
y = temp  
print('The value of x after swapping: {}'.format(x))  
print('The value of y after swapping: {}'.format(y))  
Without temporary variable  
x = 5  
y = 10
```

```
x, y = y, x  
print("x =", x)  
print("y =", y)  
Output
```

```
The value of x after swapping: 10  
The value of y after swapping: 5
```

#### 4) Python Program to convert temperature in celsius to fahrenheit

```
# change this value for a different result  
celsius = 37.5  
# calculate fahrenheit  
fahrenheit = (celsius * 1.8) + 32  
print("%0.1f degree Celsius is equal to %0.1f degree Fahrenheit" %(celsius,fahrenheit))
```

**Output**

```
37.5 degree Celsius is equal to 99.5 degree Fahrenheit
```

#### 5) Python Program to Check if a Number is Positive, Negative or 0

```
num = float(input("Enter a number: "))  
if num > 0:  
    print("Positive number")  
elif num == 0:  
    print("Zero")  
else:  
    print("Negative number")
```

**Output**

```
Enter a number: 2  
Positive number
```

#### 6) Python program to check if the input number is odd or even.

```
# A number is even if division by 2 gives a remainder of 0.  
# If the remainder is 1, it is an odd number.  
num = int(input("Enter a number: "))  
if (num % 2) == 0:  
    print("{0} is Even".format(num))  
else:  
    print("{0} is Odd".format(num))
```

**Output 1**

```
Enter a number: 43  
43 is Odd
```

**Output 2**

```
Enter a number: 18  
18 is Even
```

7) Python program to check if year is a leap year or not

```
# User enters the year  
year = int(input("Enter Year: "))  
  
# Leap Year Check  
if year % 4 == 0 and year % 100 != 0:  
    print(year, "is a Leap Year")  
elif year % 100 == 0:  
    print(year, "is not a Leap Year")  
elif year % 400 == 0:  
    print(year, "is a Leap Year")  
else:  
    print(year, "is not a Leap Year")
```

#### Output

```
2000 is a leap year
```

8) Python program to find the largest number among the three input numbers

```
# change the values of num1, num2 and num3  
# for a different result  
num1 = 10  
num2 = 14  
num3 = 12  
# uncomment following lines to take three numbers from user  
#num1 = float(input("Enter first number: "))  
#num2 = float(input("Enter second number: "))  
#num3 = float(input("Enter third number: "))  
if (num1 >= num2) and (num1 >= num3):  
    largest = num1  
elif (num2 >= num1) and (num2 >= num3):  
    largest = num2  
else:  
    largest = num3  
print("The largest number is", largest)
```

#### Output

```
The largest number is 14.0
```

9) Multiplication table (from 1 to 10) in Python

```
num = 12
# To take input from the user
# num = int(input("Display multiplication table of? "))
# Iterate 10 times from i = 1 to 10
for i in range(1, 11):
    print(num, 'x', i, '=', num*i)
```

### Output

```
12 x 1 = 12
12 x 2 = 24
12 x 3 = 36
12 x 4 = 48
12 x 5 = 60
12 x 6 = 72
12 x 7 = 84
12 x 8 = 96
12 x 9 = 108
12 x 10 = 120
```

### 10 ) Python Program to Print Even Numbers from Min to Max

```
minimum = int(input(" Please Enter the Minimum Value : "))

maximum = int(input(" Please Enter the Maximum Value : "))

for number in range(minimum, maximum+1):

    if(number % 2 == 0):

        print("{0}".format(number))
```

```
Please Enter the Minimum Value : 10
Please Enter the Maximum Value : 20
10
12
14
16
18
20
```

## PYTHON PROGRAMS – SET II

**1. Write a python program to obtain three numbers and print their sum.**

**# Program to input three numbers and print their sum**

```
num1= int(input("Enter first number :"))      # input the first number  
num2= int(input("Enter second number :"))     # input the second number  
num3= int(input("Enter third number :"))      # input the third number  
sum=num1+num2+num3                          # finding the sum  
print("The numbers are :",num1,num2,num3)    #printing the numbers  
print("Their sum is:",sum)                   #printing the sum
```

**Output:**

Enter first number :13

Enter second number :12

Enter third number :0

The numbers are : 13 12 0

Their sum is: 25

**2. Write a python program to find the area and perimeter of a rectangle.**

**# Program to find the area and perimeter of a rectangle**

```
l=float(input("Enter the length of the rectangle:"))    # input length  
b=float(input("Enter the breadth of the rectangle:"))   # input breadth  
area=l*b                                              # calculation of area
```

```
perimeter=2*(l+b)                                # calculation of perimeter
print("area :",area)
print("perimeter :",perimeter)
```

**Output:**

```
Enter the length of the rectangle:2
Enter the breadth of the rectangle:1
area : 2.0
perimeter : 6.0
```

**3. Write a python program to swap two numbers using a third variable.**

**# Program to swap 2 numbers**

```
x=int(input("Enter the first number: "))      # input the first value
y=int(input("Enter the second number: "))      # input the second value
print("The original numbers are: ",x,y)
temp=x                                         # x value getting stored into temp variable
x=y                                         # y value getting stored into x variable
y=temp                                         # temp value getting stored into y variable
print("After swapping, the numbers are: ",x,y)
```

**Output:**

```
Enter the first number: 5
Enter the second number: 6
The original numbers are: 5 6
After swapping, the numbers are: 6 5
```

**4. Write a python program to enter two numbers and perform all arithmetic operations on them.**

**# Program to perform all arithmetic operations on 2 numbers**

```
x=int(input("Enter the first number: "))           # input the first value
y=int(input("Enter the second number: ")) # input the second value
sum=x+y                                         # finding sum
diff=x-y                                         # finding difference
mul=x*y                                          # finding product
div=x/y                                           # finding quotient value
mod=x%y                                           # finding remainder value
print("The numbers are : ",x,y)
print("Sum= ",sum)
print("Difference= ",diff)
print("Product= ",mul)
print("Division= ",div)
print("Modulus= ",mod)
```

**Output:**

Enter the first number: 5

Enter the second number: 2

The numbers are : 5 2

Sum=: 7

Difference= 3

Product= 10

Division= 2.5

Modulus= 1

**5. Write a python program to test the divisibility of a number with another number  
(i.e., if a number is divisible by another number)**

**# Program to test the divisibility of a number with another number**

```
num_1=int(input("Enter first number : "))
num_2=int(input("Enter second number : "))
remainder=num_1%num_2           # finding the remainder
if remainder==0:                # checking whether remainder is 0
    print(num_1,"is divisible by",num_2)
else:
    print(num_1,"is not divisible by",num_2)
```

**Output:**

Enter first number : 14

Enter second number : 3

14 is not divisible by 3

**6. Write a python program to accept three numbers and print the largest of the three using only if statement.**

**# Program to find the largest among three numbers**

```
x=float(input("Enter the first number :"))
y=float(input("Enter the second number :"))
z=float(input("Enter the third number :"))
max=x
if y>max:
    max=y
if z>max:
    max=z
print("Largest is ",max)
```

**Output:**

Enter the first number :10

Enter the second number :12

Enter the third number :9

Largest is 12.0

**7. Write a python program that takes the name and age of the user as input and displays a message whether the user is eligible to apply for a driving license or not.**

**# Program to check whether the user is eligible for driving license**

```
name=input("Enter the name: ")
age=int(input("Enter age: "))
if age>=18:
    print(name,"is eligible for a driving licence.")
else:
    print(name,"is not eligible for a driving licence.")
```

**Output:**

Enter the name: Nakul

Enter age: 12

Nakul is not eligible for a driving licence.

**8. Write a python program to calculate the simple and compound interest.**

```
p=float(input("Enter the principal amount: "))
r=float(input("Enter the rate of interest: "))
t=float(input("Enter the time in years: "))
si=(p*r*t)/100
```

```
ci=p*(pow((1+r/100),t))
print("Principal amount : ",p)
print("Interest rate : ",r)
print("Time in years : ",t)
print("Simple interest : ",si)
print("Compound interest : ",ci)
```

### **Output:**

```
Enter the principal amount: 250000
Enter the rate of interest: 36
Enter the time in years: 1
Principal amount : 250000.0
Interest rate : 36.0
Time in years : 1.0
Simple interest : 90000.0
Compound interest : 339999.9999999994
```

**9. Write a python program to demonstrate accessing an element from a list and then modifying an element in the list.**

#### **# Program to access an element from a given list**

```
List=["Apple","Orange","Pears","Melon"] # List is created with 4 items
print(List) # List is printed
print(List[0]) # Printing the value from index number 0
print(List[3]) # Printing the value from index number 4
List[2]="Banana" # The item in the index number 3 is modified
print(List) # Printing of the new list
```

**Output :**

['Apple', 'Orange', 'Pears', 'Melon']

Apple

Melon

['Apple', 'Orange', 'Banana', 'Melon']

**10. Write a python program to take a list of items:**

**animals=['cat','dog','mouse','hamster']**

**and print out each item using a for loop.**

```
animals=['cat','dog','hamster','mouse']
```

```
for one in animals:
```

```
    print(one)
```

**Output:**

cat

dog

hamster

mouse

**KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION  
SAMPLE QUESTION PAPER (2022-23)**

**Class: IX**

Max. Marks: 50

**Sub: Artificial Intelligence**

**Time: 1 ½ hrs**

## **General Instructions:**

1. Please read the instructions carefully.
  2. This Question Paper is divided into 02 sections, viz., Section A and Section B.
  3. Section A is of 10 marks and has 12 questions on Employability Skills.
  4. Section B is of 40 marks and has 30 questions on Subject specific Skills.
  5. Do as per the instructions given in the respective sections.
  6. Marks allotted are mentioned against each section/question.
  7. All questions must be attempted in the correct order

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## **SECTION A**

8	Manufacturing businesses are the type of a. Trade Businesses b. Hybrid based business c. Product based business d. Service based businesses	1
(B)	<b>Answer any 2 question out of the given 4 questions on Employability Skills</b>	<b>2 X 2=2</b>
9	<b>How to build self – confidence?</b>	2
10	<b>Difference between interests and abilities?</b>	2
11	<b>In computer systems, what is the function of the BIOS?</b>	2
12	<b>Differentiate between smartphone vs. tablet.</b>	2
	<b>SECTION B</b>	
(A)	<b>Answer any 8 questions out of the given 12 questions on Artificial Intelligence</b>	<b>8X1=8</b>
13	<b>Artificial Intelligence is about _____.</b> a. Playing a game on Computer b. Making a machine Intelligent c. Programming on Machine with your Own Intelligence d. Putting your intelligence in Machine	1
14	<b>The important principle that artificial intelligence embraces is holistic inclusive and progressive development in immersive ways by _____.</b> a. Problem solving b. Creative thinking c. Critically Analyzing data d. All of the above	1
15	<b>This field is enabling computers to identify and process images like humans do:</b> a. Face Recognition b. Model-view-controller c. Computer Vision d. Eye-in-Hand System	1
16	<b>_____ is a series of autonomous robotic vacuum cleaners used in Home.</b> a. Roomba b. Expert System c. Deep Blue d. Goostman	1
17	<b>_____ is a collection of data in tabular format.</b> a. Dataset b. Structured Data c. Unstructured Data d. None of the above	1
18	<b>Identify the type of “facial identities for facial expressions” learning algorithm.</b> a. General patterns b. Unsupervised patterns c. Recognition patterns d. None of the above	1
19	<b>An intelligent agent interacts with the environment and learns to operate within that environment through _____</b> a. Supervised Learning	1

	b. Unsupervised Learning c. Reinforcement Learning d. All of the above	
20	The output at each node is called _____. A. node value B. Weight C. neurons D. axons	1
21	<b>What is the term for applying machine learning techniques to a large database?</b> a. Data encapsulation b. Database c. Data mining d. None of the above	1
22	Who developed the Python language? a. Zim Den b. Guido van Rossum c. Niene Stom d. Wick van Rossum	1
23	Which one of the following is the correct extension of the Python file? a. .py b. python c. .p d. None of these	1
24	Which of the following is not a keyword in Python language? a. val b. raise c. try d. with	1
(B)	<b>Answer any 8 questions out of the given 12 questions on Artificial Intelligence</b>	8X2=16
25	What is the role of sensors in smart devices?	2
26	<b>What do you mean by Machine Learning?</b>	2
27	What do you understand by the third wave of AI?	2
28	Briefly explain IoT Things	2
29	<b>What is Expert System?</b>	2
30	Give any three example of Artificial Intelligence Domain?	2
31	Define System Map. What is the role of System Maps while solving a problem?	2
32	Sunita's teacher gave her an assignment to prepare a presentation on the topic "AI, Machine Learning and Deep Learning." While preparing the assignment, she became very confused about the difference between the three. Can you help her in preparing the assignment?	2
33	<b>What is the 4Ws Problem canvas in AI?</b>	2

34	<p>Read the following program carefully and rewrite the corrected code after removing all syntactical errors</p> <pre>X = integer(input("Enter your age ")) Y = input("Enter your name ") If X =&gt; 18     Print("You are eligible for driving license ") Otherwise:     Print("Sorry ", Y, " You are not eligible for driving license ")</pre>	2
(C)	<b>Answer any 4 questions out of the given 6 questions on Artificial Intelligence</b>	4 X 4 =16
35	Briefly Explain the different stages of AI Project Cycle?	4
36	Difference Between Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL)	4
37	How will you achieve sustainable development goals using Artificial Intelligent systems?	4
38	Briefly Explain the different types of Data Modelling?	4
39	What are the advantages and disadvantages of Artificial Neural networks?	4
40	Differentiate between the following: a) For loop and While loop b) Break statement and Continue statement	4

# **Artificial Intelligence Sample Paper Class 9 Code 417**

## **2021-22 Term-1**

### **SAMPLE QUESTION PAPER FOR TERM -1**

Max. Time Allowed: 1 Hour

Max. Marks: 25

#### **General Instructions:**

- 1. This Question Paper is divided into 03 sections, viz., Section A, Section B and Section C.**
- 2. Section A is of 05 marks and has 06 questions on Employability Skills.**
- 3. Section B is of 15 marks and has 20 questions on Subject specific Skills.**
- 4. Section C is of 05 marks and has 07 competency-based questions.**

#### **SECTION A**

**Answer any 5 questions out of the given 6 questions on Employability Skills (1 x 5 = 5 marks)**

##### **1. Match the following.**

Column A: Barriers	Column B: Examples
1. Language	A. Trying to read a book when somebody else is watching TV in the same room
2. Emotional	B. In some cultures, wearing shoes and walking inside the kitchen is considered rude and disrespectful
3. Environmental	C. Talking in Hindi when others know only Tamil
4. Cultural	D. Parent is not talking to the child

- a) 1 -> D; 2 -> A; 3 -> C; 4 -> B
- b) 1 -> C; 2 -> D; 3 -> A; 4 -> B ✓
- c) 1 -> C; 2 -> D; 3 -> B; 4 -> A
- d) 1 -> C; 2 -> A; 3 -> D; 4 -> B

**2. Which of these sentences use uppercase letters correctly?**

- a) I am Hungry.
- b) Divya and Sunil are reading.
- c) The bucket is full of water.
- d) She lives in Delhi. ✓

**3. Niraj had difficulty in speaking English. He, therefore, avoided talking to his classmates. He believed that he can learn English by joining English speaking classes and in few days he was able to speak English fluently. Which of the following quality is he demonstrating?**

- a) Personal hygiene and grooming
- b) Self-control
- c) Self-confidence ✓
- d) Team work

**4. What is the best way to start our day positively?**

- a) Think about all your accomplishment so far and feel good about it. ✓
- b) Think about all that can go wrong.
- c) Think about the difficult test you will face during the day.
- d) Think about the traffic on the road and feel stressed.

**5. Put the following units of storage into the correct order, starting with the smallest unit first and going down to the largest unit:**

- (a) Kilobyte (b) Byte (c) Megabyte (d) Terabyte (e) Gigabyte (f) Bit

Give your answer from the following code:

- a) (f) -> (b) -> (a) -> (c) -> (d) -> (e)
- b) (f) -> (b) -> (a) -> (d) -> (e) -> (c)
- c) (f) -> (b) -> (a) -> (d) -> (c) -> (e)
- d) (f) -> (b) -> (a) -> (c) -> (e) -> (d) ✓

**6. Which one of the following statements is false?**

- a) You need to create an account before you can send an e-mail.
- b) You do not need an Internet connection to use your Gmail account. ✓
- c) You should sign out of your account when you are not using the computer.
- d) You must not share your password with others.

**SECTION B**

**Answer any 15 questions out of the given 20 questions (1 x 15 = 15 marks)**

**7. Statement1: AI is getting integrated into our lives seamlessly.**

**Statement2: Often we do not even realize that we are using AI.**

- a) Statement 2 is correct and Statement 1 is incorrect.
- b) Statement 1 is correct and Statement 2 is incorrect
- c) Both Statement1 and Statement2 are correct ✓
- d) Both Statement1 and Statement2 are incorrect

**8. IoT is abbreviated as**

- a) Institute of Technology
- b) Internet of Things ✓
- c) Index organized Table
- d) Inter-operability Test

**9. Match column A with Column B.**

Column A	Column B
1.Expert System	A. Simulate how a human would behave as a conversational partner
2. Chatbot	B. Uses knowledge stored in a knowledge base but requires the intervention of human expert

3. Digital Assistant	C. Autonomous vehicle
4. self-driving car	D. Works on various mobile platforms

- a) 1 -> B; 2 -> A; 3 -> D; 4 -> C ✓
- b) 1 -> A; 2 -> B; 3 -> C; 4 -> D
- c) 1 -> D; 2 -> A; 3 -> B; 4 -> C
- d) 1 -> C; 2 -> A; 3 -> D; 4 -> B

**10. An application lets you search what you see, get things done faster and understand the world around you – using just your camera or a photo. Which domain does this app belong to?**

- a) Natural Language Processing
- b) Data Sciences
- c) Computer Vision ✓
- d) Artificial Language Processing

**11. A web-based software that is used to create interactive stories in Choose Your Own Adventure Format (CYOA) is**

- a) Chatbot
- b) Jupyter notebook
- c) Internet explorer
- d) Inklewriter ✓

**12. Match the following.**

Column A	Column B
1. Smart Mobility	i) Resources and Sustainability

2. Smart Environment	ii) Creativity and Social Capital
3. Smart People	iii) Infrastructure and Transport

- a) 1 -> i) ; 2 -> ii) ; 3 -> iii)
- b) 1 -> ii) ; 2 -> iii) ; 3 -> i)
- c) 1 -> iii) ; 2 -> i) ; 3 -> ii) ✓
- d) 1 -> iii) ; 2 -> ii) ; 3 -> i)

**13. Fill in the blanks with the correct answers given below:**

The \_\_\_\_\_ Sustainable Development Goals (SDGs) were launched at the United Nations Sustainable Development Summit in New York in the year \_\_\_\_\_, forming the \_\_\_\_\_ Agenda for Sustainable Development.

- a) 17 , 2015 , 2030 ✓
- b) 15 , 2010 , 2025
- c) 17, 2010 , 2025
- d) 15 , 2010 , 2030

**14. 2.37 billion people are without food or unable to eat a healthy balanced diet on a regular basis. Which Sustainable Development Goal are we talking about?**

- a) No Poverty
- b) Zero hunger ✓
- c) Good health and well-being
- d) Decent work and economic growth

**15. Statement 1: The drone technology help farmers spot intrusions, crop diseases, predict the amount of crop production, and saves time and avoids the difficulties of physical manual inspections.**

**Statement 2: The statement given above is an example of Natural Language Processing.**

- a) Both Statement1 and Statement2 are correct

- b) Both Statement1 and Statement2 are incorrect
- c) Statement 2 is correct and Statement 1 is incorrect.
- d) Statement 1 is correct and Statement 2 is incorrect ✓

**16. When you search for 'Doctor' on a search website, the results for Doctor images might mostly come up as 'male'. Whereas for 'Nurse' most results would be 'female'. What does this depict?**

- a) Gender bias ✓
- b) Data Privacy
- c) Poor training
- d) Lack of access

**17. Match column A with Column B**

Column A	Column B
1. Problem Scoping	A. implement a suitable model that matches the requirements
2. Data Acquisition	B. interpret some useful information out of data
3. Data Exploration	C. collect data from reliable sources
4. Modelling	D. finalise the aim of the AI project

- a) 1 -> B; 2 -> A; 3 -> D; 4 -> C
- b) 1 -> D; 2 -> B; 3 -> C; 4 -> A
- c) 1 -> D; 2 -> C; 3 -> B; 4 -> A ✓
- d) 1 -> C; 2 -> D; 3 -> A; 4 -> B

**18. The 4 Ws of the 4W problem canvas are:**

- a) Who, What, Where and Why ✓

- b) Who, What, When and Why
- c) Who, What, Where and When
- d) Who, Where, When and Why

**19. Statement 1: Where block helps you to focus on the context/situation/location of the problem.**

**Statement 2: What block helps you need to determine the nature of the problem.**

- a) Statement 1 is correct and Statement 2 is incorrect
- b) Statement 2 is correct and Statement 1 is incorrect
- c) Both Statement 1 and Statement 2 are incorrect
- d) Both Statement 1 and Statement 2 are correct ✓

**20. \_\_\_\_\_ helps us to summarise all the key points into one single Template so that in future, whenever there is need to look back at the basis of the problem, we can take a look at the this and understand the key elements of it.**

- a) 4W Problem canvas
- b) Problem Statement Template ✓
- c) Data Acquisition
- d) Algorithm

**21. Which of the following are valid sources for collecting data?**

- i) Announcements
- ii) Surveys
- iii) Web scraping
- iv) Application Programming Interface

- a) i) , ii) and iii)
- b) i) , ii) and iv)
- c) ii) , iii) and iv) ✓
- d) i) , iii) and iv)

**22. Statement 1 : The data with which the machine can be trained is the testing data**

**Statement 2 : The data with which the model is evaluated is the training data**

- a) Statement 1 is correct and Statement 2 is incorrect
- b) Statement 2 is correct and Statement 1 is incorrect
- c) Both Statement 1 and Statement 2 are correct
- d) Both Statement 1 and Statement 2 are incorrect ✓

**23. Identify the correct representations in a system map**

- a) Circles -> elements; arrowed lines -> relationship ✓
- b) Squares -> elements ; dotted lines -> relationship
- c) Circles -> elements ; dotted lines -> relationship
- d) Squares -> elements ; arrowed lines -> relationship

**24. Which of these is NOT used for visualization in AI?**

- a) Sketchy Graph
- b) Scatter plot
- c) Ruler ✓
- d) Bar chart

**25. Which of the following is an example of rule based approach?**

- a) Pixel it activity
- b) Decision trees ✓
- c) Histogram
- d) Illustration diagram

**26. Which of the following is incorrect?**

- a) In rule based approach, the relationship or patterns in data are defined by the developer.

- b) Decision tree looks like an upside-down tree.
- c) Pixel It activity is an example of how computers see images, process them and classify them.
- d) In learning based approach, the relationship or patterns in data are defined by the developer. ✓

## SECTION C

### (COMPETENCY BASED QUESTIONS)

**Answer any 5 questions out of the given 7 questions (1 x 5 = 5 marks)**

**27. With so many people using electricity on a daily basis—whether it is to charge their cell phones or to use their TV—a lot of cables (made of plastic) must be used. Plastic destroys our ecosystem, yet we continue to produce it. Indispensable as it may seem, it has an adverse effect on the environment. The manufacturing of plastic is not exactly ecofriendly. With a little help from modern technology Elif discovered a way to help curb our plastic problem. She used banana peels as the main ingredient to make bio-plastics.**

**Which of the Sustainable Development Goal does this scenario relate to?**

- a) Life on land
- b) Responsible consumption, and production ✓
- c) Affordable and clean energy
- d) Sustainable cities and communities

**28. Air pollution kills an estimated seven million people worldwide every year. WHO data shows that 9 out of 10 people breathe toxic air. From smog hanging over cities to smoke inside the home, air pollution poses a major threat to human health and climate. The major pollution sources include vehicles, power generation, agriculture/waste incineration, and industry. Harmful gases like SO<sub>2</sub>, NO<sub>2</sub>, CO are emitted directly into air because of pollution. Deploying an air quality index monitor is one way that would help to know the local air quality and take action to protect their health. Taking this as the problem, choose which of the following would be the ideal problem statement template.**

- a) Our WHO have a problem that people breathe toxic air when smog hangs over cities. An ideal solution would be to shut down industries and stop the movement of vehicles in major cities.
- b) Our people have a problem that they die in accidents when more number of vehicles are used. An ideal solution would be to develop be to stop the movement of vehicles in major cities.

- c) Our people have a problem that air pollution has damaging effects on human health when harmful gases like SO<sub>2</sub>, NO<sub>2</sub>, CO are emitted directly into air. An ideal solution would be to develop an air quality index monitor so that one can know the local air quality and take action to protect their health. ✓
- d) Our WHO have a problem that people die every year when there is an increase in the number of vehicles and industries. An ideal solution would be to make sure people stay indoors to protect their health.

**29. While designing a surveillance system for the premises where a costly diamond was to be kept for exhibition, we do the following tasks.**

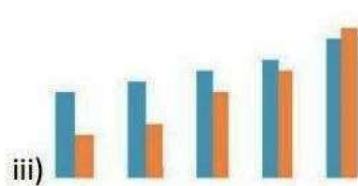
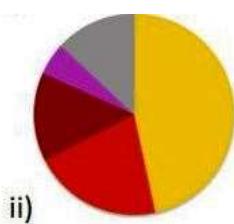
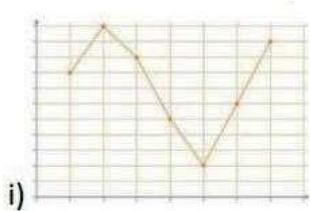
- a) Get photographs of all the authorised people.
- b) Get photographs of all the unauthorised people.
- c) Get photographs of the premises.
- d) Get photographs of all the visitors.

**Which stage of AI project cycle are we talking about?**

- a) Problem Scoping
- b) Data Exploration
- c) Modelling
- d) Data Acquisition ✓

**30. Match the best choice of graph for the data below.**

1. Chart to show the number of students in a school over past 5 years.
2. Chart to show the temperature on each day of the week.
3. Chart to show percentage of each sale of ticket type at a concert.



- a) 1 -> i) ; 2 -> ii) ; 3 -> iii)
- b) 1 -> ii) ; 2 -> iii) ; 3 -> i)
- c) 1 -> iii) ; 2 -> i) ; 3 -> ii) ✓

d) 1 -> iii) ; 2 -> ii) ; 3 -> i)

**31. Information about three games are given below. Identify the game and the respective domain**

1. The players of this game have to guess what the opponents will choose and make an appropriate shape to defeat them.
  2. This is a simple twenty questions game in which the player can ask 20 Yes/No questions to identify the animal.
  3. In this game, the computer asks the player to find the objects that match certain images within a time limit.
- a) 1. Emoji Scavenger Hunt -> Computer vision; 2. Rock, Paper, Scissor -> Natural Language Processing; Mystery Animal -> Data Sciences
- b) 1. Mystery Animal -> Data Sciences; 2. Emoji Scavenger Hunt -> Natural Language Processing; 3. Rock, Paper, Scissor -> Computer vision
- c) 1. Rock, Paper, Scissor -> Data Sciences; 2. Emoji Scavenger Hunt -> Natural Language Processing; 3. Mystery Animal -> Computer vision
- d) 1. Rock, Paper, Scissor -> Data Sciences; 2. Mystery Animal -> Natural Language Processing; 3. Emoji Scavenger Hunt -> Computer vision ✓

**32. Choose the AI applications among the ones given below:**

- i) Gmail uses Smart Compose feature can help you type emails faster as it offers suggestions for words and phrases as you type.
- ii) Websites make use of a software that simulates human-like conversations with users via text messages on chat.
- iii) Soap dispensers use infrared sensors with which when hands are placed in the proximity of the sensor, dispense the designated amount of soap.
- iv) Face recognition technology that identifies and verifies a person using the person's facial features and automatically marks attendance.

- a) i), ii) and iv) ✓
- b) i), ii) and iii)
- c) ii), iii) and iv)
- d) i), iii) and iv)

**33. Water availability is a major environmental problem in the world. We continue to flush billions of litres of treated fresh water down our toilets every day. Since 40% of the 6 billion people on earth use toilets, it is a lot of water. Rohit, an Indian embarked on a project to redesign the water closet / flush to reduce the consumption of water. He made this possible with a simple mechanism added to the conventional closet that creates a partial vacuum when the user pushes down the flush lever. He called it the Vacu-Flush.**

Which of the Sustainable Development Goal does this scenario relate to?

- a) Life on land
- b) Responsible consumption, and production
- c) Clean water and sanitation ✓
- d) Partnerships for goals

## **Artificial Intelligence – Sample Paper**

Time: 2 Hours

Max. Marks: 50

### **General Instructions:**

1. This question paper consists of two parts
2. **Section A: Employability Skills (10 Marks)**
3. **Section B: Subject Skills (40 Marks)**

### **SECTION—A**

#### **Employability Skills: (10 Marks)**

##### **A. Answer any 4 questions out of the given 6 questions of 1 mark each. ( $1 \times 4 = 4$ )**

1. .... is the means through which the message travels from the source to the receiver.  
a) Communication Channel b) Environmental Barrier c) Feedback d) Communication Cycle
2. .... people are able to recognise their strengths and accept weaknesses at the same time.  
a) Arrogant b) Unconfident c) Self-confident d) Negative
3. Ginny is a new student in the class who has come from Assam to Delhi. He is feeling shy to interact with the other students in the class. Which factor is influencing such behaviour of him?  
a) Physical Factor b) Social Factor c) Cultural Factor d) Environmental Factor
4. Shubham wants to take the backup of a very important file. Which portable storage device should he use for the same?  
a) Blu-ray disc b) Pen drive c) CD d) RAM
5. A .... business uses raw material, labour, and other production processes to manufacture goods.  
a) Manufacturing b) Merchandising c) Hybrid d) Service
6. An aquarium is an example of an ....  
a) Habitat b) Abiotic components c) Non-living matter d) Ecosystem

##### **B. Answer any 3 questions out of the given 5 questions of 2 marks each. ( $2 \times 3 = 6$ )**

7. Write and explain any two features of effective communication.
8. Describe briefly the three key skills required for self-management.
9. What do you mean by peripheral devices? How can we categorise them?
10. What do you understand by the term Business? What are the four forms of business organisations based on ownership?
11. What are the benefits of moving towards green economy?

### **SECTION—B**

#### **Subject Skills: (40 Marks)**

##### **C. Answer any 10 questions out of the given 12 questions of 1 mark each. ( $1 \times 10 = 10$ )**

12. Which of the following is not a data visualisation tool?  
a. Microsoft Excel b. Google Data Studio c. Qlikview d. None of the above

13. In a decision tree, the final node which does not split into sub nodes is called?  
a. Interior Node b. Exterior Node c. Terminal Node d. Root Node
14. For which type of neural network training, the networks are trained to provide correct output by using several example inputs?  
a. Supervised Learning b. Unsupervised Learning c. Reinforcement Learning d. None
15. Artificial can be used in which of the following fields?  
a. Speech Recognition b. Natural Language Processing c. Vision Systems d. All of the above
16. Watson is an AI system developed by which of the following companies?  
a. Apple b. Microsoft c. Amazon d. IBM
17. .... are people responsible for collecting, analysing and drawing interpretation from huge datasets.  
a. Machine Learning Engineers b. Data Scientists c. AI Research Scientists d. Business Intelligence Developer
18. DeepMind AI technology was created by .....
19. .... data contains both location and time information.
20. The node at the top or a beginning of a tree is known as a .....
21. .... is the first step after Identifying the problem in developing AI projects.
22. .... is used for producing meaningful phrases and sentences in the form of natural language. (Natural Language Generation)
23. State whether True or False (0.5 Marks each):  
a. The nodes in Artificial Neural Networks can take inputs from only one other node. (True/False)  
b. Discrete numerical data is the data which only contains whole numbers. (True/False)
- D. Answer any 4 questions out of the given 6 questions of 2 marks each. ( $2 \times 4 = 8$ )
24. Mention the role of a data scientist.  
25. Define Machine Learning.  
26. What is meant by Unsupervised Learning?  
27. Briefly describe Data Visualisation  
28. Write a short note on Big Data.  
29. Define structured data.
- E. Answer any 4 questions out of the given 6 questions of 3 marks each. ( $3 \times 4 = 12$ )
30. Give 3 real-life examples of artificial intelligence.  
31. How has AI helped in automation?  
32. Write a note in Computer Vision.  
33. Discuss the types of Weak AI Systems  
34. Explain the Black Box Problem in AI.  
35. Write a short note on decision trees.
- F. Answer any 2 questions out of the given 4 questions of 5 marks each. ( $5 \times 2 = 10$ )
36. Discuss about the ethical concerns regarding artificial intelligence with an example.  
37. How is AI helping to achieve sustainable development goals?  
38. Discuss the uses of Neural Networks.  
39. Write a short note on the evaluation and deployment stage in an AI Project Cycle

**References:**

<https://cbseacademic.nic.in/skill-education.html>

[https://cbseacademic.nic.in/web\\_material/Curriculum21/publication/secondary/Employability\\_Skills\\_IX.pdf](https://cbseacademic.nic.in/web_material/Curriculum21/publication/secondary/Employability_Skills_IX.pdf)

[https://cbseacademic.nic.in/web\\_material/Curriculum20/AI\\_Curriculum\\_Handbook.pdf](https://cbseacademic.nic.in/web_material/Curriculum20/AI_Curriculum_Handbook.pdf)

<https://aiforkids.in/class-9/>

and

Various other websites for images and sample question answers.

