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7

COMPUTER

A WONDER MACHINE

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TEACHER'S MANUAL

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Computer: A Wonder Machine

BOOK 7

Chapter 1

Number System—An Introduction

1. Answer the following questions:

(a) The computer translates words and letters into numbers before storing, because computer understands only numbers. Therefore, we can say that computers talk and understand only numbers.

(b) Number System are of the following types:

(i) Decimal Number System

(ii) Binary Number System

(iii) Octal Number System

(iv) Hexadecimal Number System

(c) (i) Decimal Number System is a number system that we use in our day-to-day life.

- Base for decimal number system is 10 as it uses 10 digits (0,1,2,3,4,5,6,7,8,9).
- In all the number systems, the first digit is zero.
- In all the number systems, the maximum value of digit is one less than the value of base.
- It is also known as base-10 system.
- In decimal number system, the successive positions to the left of the decimal point represent units, tens, hundreds, thousands and so on.
- Digits signify different values depending on the position it occupies in the number.

For example, in $(2789)_{10}$—

9 signifies $9 \times 10^0 = 9 \times 1 = 9$

8 signifies $8 \times 10^1 = 8 \times 10 = 80$

7 signifies $7 \times 10^2 = 7 \times 100 = 700$

2 signifies $2 \times 10^3 = 2 \times 1000 = 2000$

On adding them = 2000 + 700 + 80 + 9 = 2789

(ii) Binary Number System

The characteristics of binary number system are as follow:

- Binary number system has only two symbols or digits, *i.e.*, 0 and 1.

- Binary number system is also known as base-2 number system.
- Each position in a binary number represents a power of the base (2).

  Hence, the rightmost position is the units (2^0) position. The second position from right is the 2's (2^1) position, and proceeding in this way.

  For example, 10101 or $(10101)_2$ is

  $= (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$

  $= (1 \times 16) + (0 \times 8) + (1 \times 4) + (0 \times 2) + (1 \times 1)$

  $= 16 + 0 + 4 + 0 + 1$

  $= (21)_{10}$
- Binary equivalent of decimal digit 2 is 10 or $(10)^2$, read as one zero and not ten.
- With n bits (n positions) only 2^n patterns are possible. (Binary digit is also referred to as bit)

(d) (i) 455_{10}

Repeated Division		Remainders
2	455	
2	227	1
2	113	1
2	56	1
2	28	0
2	14	0
2	7	0
2	3	1
2	1	1
	0	1

Write in this order

$455_{10} = 111000111$

(ii) 79_{10}

Repeated Division		Remainders
2	79	
2	39	1
2	19	1
2	9	1
2	4	1
2	2	0
2	1	0
2	0	1

Write in this order

$79_{10} = 1001111$

(iii) 1679_{10}

Repeated Division		Remainders
2	1679	
2	839	1
2	419	1
2	209	1
2	104	1
2	52	0
2	26	0
2	13	0
2	6	1
2	3	0
2	1	1
2	0	1

Write in this order

$1679_{10} = 11010001111$

(iv) 1235_{10}

Repeated Division		Remainders	
2	1235		
2	617	1	
2	308	1	
2	154	0	
2	77	0	Write in this order
2	38	1	
2	19	0	
2	9	1	
2	4	1	
2	2	0	
2	1	0	
2	0	1	

$1235_{10} = 10011010011$

(e) (i) 111001_2

32	16	8	4	2	1
× 1	× 1	× 1	× 0	× 0	× 1
32	16	8	0	0	1

32 + 16 + 8 + 0 + 0 + 1 = 57

Hence, $111001_2 = 57_{10}$

(ii) 1010101_2

64	32	16	8	4	2	1
× 1	× 0	× 1	× 0	× 1	× 0	× 1
64	0	16	0	4	0	1

64 + 0 + 16 + 0 + 4 + 0 + 1 = 85

Hence, $1010101_2 = 85_{10}$

(iii) 110110_2

32	16	8	4	2	1
× 1	× 1	× 0	× 1	× 1	× 0
32	16	0	4	2	0

32 + 16 + 0 + 4 + 2 + 0 = 54

Hence, $110110_2 = 54_{10}$

(iv) 111011_2

32	16	8	4	2	1
× 1	× 1	× 1	× 0	× 1	× 1
32	16	8	0	2	1

32 + 16 + 8 + 0 + 2 + 1 = 59

Hence, $111011_2 = 59_{10}$

2. Fill in the blanks:

(a) Decimal number system

(b) words, number

(c) Binary number system

(d) 1, 0

(e) Bit

(f) Base-8 number system

(g) Hexadecimal number systems

3. Match the following:

(a) (iv) Decimal number system

(b) (viii) Octal number system

(c) (x) Hexadecimal number system

(d) (i) Binary number system

(e) (ii) 11001000_2

(f) (ix) 100110_2

(g) (iii) 27_{10}

(h) (v) 1101_2

(i) (vii) 1010100_2

(j) (vi) 10010_2

4. Write T for true and F for false statements:

(a) F (b) F (c) F (d) T (e) T

(f) F (g) T

5. Tick (✓) the correct option:

(a) (ii) 1100000110

(b) (i) Base-10 system

(c) (iv) Repeated division method

(d) (i) 1011001

(e) (i) 44

(f) (ii) 1111010100

(g) (iii) 92

6. Application-based Questions

(a) Computers use binary numbers instead of decimal numbers because they operate with electrical signals that have only two states: ON (1) and OFF (0). This allows them to process and store information more easily, quickly and reliably.

(b) Calculators use number systems to perform calculations efficiently. They take input in decimal, convert it into binary for processing, carry out calculations using binary arithmetic and then convert the result back into decimal for display. This ensures quick and accurate results.

(c) Sneha can make her secret code more complex by using different number systems like binary, octal and hexadecimal. She can mix them, apply mathematical tricks like adding or subtracting numbers or create custom patterns to make decoding harder. These techniques will help her design a fun and challenging secret code.

(d) Computers store data as 0s and 1s (binary). Data like text, photos and videos is converted into this form and saved in memory. When Anil transfers data, it remains in binary to keep it safe and readable.

(e) Steps to find the decimal equivalent of the binary number 1101 are as follows:

(i) Write the binary number with place values (starting from right, powers of 2).

$1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

(ii) Calculate each term.

$1 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1$

(iii) Add the values.

$8 + 4 + 0 + 1 = 13$

So, the decimal equivalent of 1101 (binary) is 13 (decimal).

Chapter 2
Advanced Features of Excel

1. Answer the following questions:

(a) Sorting means arranging the data in an ordered sequence in a systematic manner so that the analysis can be done easily.

(b) We can sort the columns in two ways:

(i) Ascending – Sorting is done from A-Z

Home tab→ Editing group→ Sort & Filter→ Sort A to Z

(ii) Descending – Sorting is done from Z-A

Home tab→ Editing group→ Sort & Filter→ Sort Z to A

(c) Following options available in Print pane to print worksheet are:

- Number of copies
- Which sheets to be printed
- Name of the printer
- Size of the page
- Orientation
- Margins
- With or without Scaling

(d) Excel provides an interesting feature using which we can view rows of data (records) that suit a specified selection criterion. This feature is called filtering data. We can filter records from an identified range of data by defining a filter condition.

(e) When we know the result and want to know the input value, at that time the Goal Seek feature is used. Therefore, we can say that goal seeking is the process of finding the correct input value when only the output is known.

2. Fill in the blanks:

(a) Backstage

(b) Set cell

(c) Advanced filter

(d) (i) Ascending

(ii) Descending

(e) Sort & Filter group → Clear option

3. Match the following:

(a) (viii) A to Z sorting

(b) (ix) Z to A sorting

(c) (iv) Sort and Filter group

(d) (vii) Rows with specified selection criteria

(e) (vi) What if analysis

(f) (iii) Sorting by multiple columns

(g) (v) Backstage

(h) (i) CTRL + SHIFT + L

(i) (ii) Forecast group

4. Write T for true and F for false statements:

(a) F (b) T (c) T (d) T (e) T

(f) F (g) T (h) F (i) T

5. Tick (✓) the correct option:

(a) (iv) Formulas

(b) (i) Backstage

(c) (iii) For value

(d) (i) Goal Seek

(e) (iii) Multiple

(f) (i) Ascending order

(g) (iv) Auto

(h) (i) CTRL + SHIFT + L

(i) (ii) Criteria

6. Application-based Questions

(a) Sorting

(b) Filtering Data

(c) By applying filter on the dataset

(d) Raj can use (multiple) Sort feature in Excel to arrange his dataset first by age and then by city.

(e) Goal Seek

Chapter 3
Charts in Excel

1. Answer the following questions:

(a) Charts are used to represent data in a graphic form. Charts are also called graphs. Charts are visually more appealing and make it easy for us to analyse and compare trends in data.

When we display information in charts and graphs, it is easier to understand and interpret the data. This makes the reporting process much easier and meaningful. We can present and analyse the information in a much more efficient manner.

(b) (i) **Titles** – The title should be such that it can clearly describe the purpose of the chart.

(ii) **Horizontal Axis** – It is the x-axis of the graph. Horizontal axis of the chart is also known as category axis.

(iii) **Legends** – It displays the colour representation of each data series in the chart.

(iv) **Data Series** – Related data points on the chart form the data series.

(v) **Vertical Axis** – It is the y-axis of the graph. Vertical axis of the chart is also known as value axis.

(c) Steps for creating a chart:

The first step is to collect the data for which we want to create a chart. We will have to do the following steps to make a chart using this data.

(i) Select the complete data range, including the column headings and row labels. This is our source data.

(ii) Open the Insert tab and locate Charts group on the ribbon.

(iii) The Charts group provides different types of charts.

(iv) Select the desired chart category from the Charts group.

(v) Click on the arrow below the selected chart category to select the chart type. Each chart category has different chart types.

(vi) Select the desired chart type from the drop-down menu.

(vii) The chart will appear in the excel sheet.

(d) Two chart tabs added to the ribbon when we insert charts to MS Excel sheet:

(i) Design tab

After creating a chart, we can change its look by using the predefined options provided by MS Excel. Following groups appear under Design tab:

- *Chart Layouts* – Help change the chart layout.
- *Chart Styles* – Various chart styles options are displayed in this group. We can change the chart style as per our need.
- *Data* – Allows us to switch between row and column using the same data. Select Data button opens the Select Data Source dialog box where we can interchange and add new entries to the source data.
- *Type* – Helps change the chart type.
- *Location* – Allows us to move the chart to different location.

(ii) Format tab

Under this tab, formatting of the chart can be done. It provides the following groups:

- *Current Selection* – Used for formatting the chart area.
- *Shape Styles* – Provide style to the line or shape, fill solid colour and outline to the shape. Can also give special effects to the shapes.
- *WordArt Style* – Provides WordArt styles to the text.
- *Arrange* – Helps in arranging the chart data.
- *Size* – Helps in changing the height and width of the chart.

2. Fill in the blanks:

(a) Charts
(b) Insert
(c) Design, Format
(d) Switch Row/Column
(e) Quick Layout
(f) Select data source
(g) Fill & Line, Effects, Series Options
(h) Fill & Line, Effects, Size and Properties, Axis Options

3. Write T for true and F for false statements:

(a) T (b) F (c) T (d) T (e) T
(f) F (g) T (h) F (i) T (j) F

4. Tick (✓) the correct option:

(a) (ii) Graphic form
(b) (ii) Only A
(c) (iii) Category axis
(d) (i) Data Series
(e) (iv) All of these
(f) (i) Quick Layout option
(g) (iv) Data Series
(h) (iv) Series Options

5. Application-based Questions

(a) (i) Select the dataset of student marks.
(ii) Go to Insert tab in Excel and locate Charts group on the Ribbon.
(iii) Choose a suitable chart type from Charts group.
(iv) The selected chart will appear in the worksheet.
(b) Chart Design
(c) (i) Select the chart to change its type.
(ii) Open Chart Design tab and locate Type group.
(iii) Click Change Chart Type option from this group.

(iv) In Change Chart Type window, select Pie Chart.

(v) Click OK and the chart will be updated.

(d) Bar Chart

(e) Line Chart

Chapter 4
Technologies of Tomorrow

1. Answer the following questions:

(a) Self-fertilizing crops are plants that can make their own food without using artificial fertilizers. These crops can get the required nutrients from air and soil with the help of some friendly bacteria. The benefits of self-fertilizing crops for farmers and the environment are as follows:

a. These crops save farmers' money by reducing the need for fertilizers.

b. They reduce pollution by avoiding the use of artificial fertilizers.

c. They increase food production.

(b) The advantages of on-demand drug manufacturing are:

a. It makes drugs more accessible and affordable for everyone, everywhere and every time.

b. It makes only the required quantity and reduces waste.

c. It improves security and quality by avoiding shortages, fakes and infections.

d. It enables innovation and customization by making new or personalized drugs.

(c) E-skin is defined as a kind of electronic system that copies natural skin. Some of its features are:

1. It is flexible.

2. It is stretchable.

3. It is a self-healing system.

4. It can sense things like heat, pressure and movement.

(d) The word "necrobotics" comes from the words "necromancy" and "robotics" which means the magic of bringing dead things back to life. It makes machines (robots) that can move and perform tasks by using dead animals and plants.

(e) Some of the applications of brain-reading robots are as follows:

1. They help people who have problems with speaking or moving their body.

2. They can create images from our thoughts.

3. They can understand what is going on in our mind.

4. They can measure tiny changes in the electricity in human brain.

2. Fill in the blanks:

(a) xenobots
(b) Energy-storing bricks
(c) Brain-reading robots
(d) necromancy, robotics
(e) artificial fertilizers
(f) pollution, environmental degradation
(g) accessible, affordable
(h) thoughts
(i) pores
(j) Living Robots

3. Write T for true and F for false statements:

(a) F (b) T (c) F (d) F (e) T
(f) F (g) T (h) T (i) F (j) T

4. Tick (✓) the correct option:

(a) (ii) Necrobotics
(b) (ii) Biological machine
(c) (i) Energy
(d) (iv) Speaking or typing
(e) (iv) All of these
(f) (iv) All of these
(g) (i) Talk to people, understand their emotions and respond

5. Application-based Questions

(a) Brain-reading Robots
(b) E-skin
(c) Necrobotics

Necrobotics is cheaper, easier and faster to use than conventional robotics. It is also difficult to replicate.

(d) Brain-reading robots can be misused for spying, mind control or hacking.
(e) (i) Save farmers' money by reducing the need for fertilizers.
(ii) Reduce pollution by avoiding the use of artificial fertilizers.
(iii) Increase food production.

Chapter 5
Internet—HTML

1. Answer the following questions:

(a) When we use a browser software and enter a website address, we are requesting for access to information that is published on the site. The computer which is requesting is called a 'client computer' and the computer that is providing the information is called the 'server'. When we ask a question to our teacher, we are requesting for information, thus we are a client and teacher who is answering our question and is giving us information is the server.

(b) Some of the important features of HTML are as follows:

- Creates a web page using tags.
- Uses graphics and display text in different fonts, sizes and colour.
- Enhances the presentation of the document using HTML elements.
- Creates hyperlinks to navigate to different documents present on the web.
- Displays data in a tabular form.
- Creates multiple windows on a web page.

(c) In HTML, the syntax used is called Tags.

Tags are enclosed within angular brackets: < and >. There are many predefined tags in HTML, which are used for specific purposes while writing programs. The programs that we create using HTML, when called using a browser, are called HTML documents. HTML programs are created with the help of, these tags. Tags start or open with <….> and end or close with </….>.

These tags define the type of document.

(d) There is a specific structure that needs to be followed while writing a program in HTML. This structure is defined by the World Wide Web Consortium. Example of a standard structure that needs to be followed is given below:

```
<HTML>
        <HEAD>
                <TITLE>
                <!Window title is written here-->
                </TITLE>
        </HEAD>
        <BODY>
        <!—Page content is written here-->
  </BODY>
  </HTML>
```

Each HTML program should have the following tags:

- <HTML> ……</HTML> : <HTML> tag helps the browser to know that the HTML code starts from here and </HTML> tag tells the browser that the HTML code ends here in the program.
- <HEAD> ……</HEAD> : This indicates the first part in HTML code. It contains the title tag.
- <TITLE>…….</TITLE> : This helps us in writing the Title of the document. It gets displayed on the title bar of the window.
- <BODY> ……</BODY> : This is the main part of our HTML document. The contents of the page are written within this tag.

(e) Tags are of two types:

- **Paired tags**–A tag is said to be a paired tag if the text is placed between a tag and its companion tag. In paired tags, the first tag is referred to as Opening Tag and the second tag is referred to as Closing Tag.

  For example,

  <H>Heading of a document </H>

- **Unpaired tags**–An unpaired tag does not have a companion tag. Unpaired tags are also known as Singular or Stand-Alone Tags.

  For example,

 <hr>

(f) (i) Short form of a web browser is a browser. A browser is a software application used to locate, retrieve and display content on the World Wide Web.

It includes web pages, images, video and other files. As a client/server model, the browser is the client run on our computer. It contacts the web server and requests for the information. The web server sends the information back to the browser, which displays the results on our computer screens.

(ii) Web page: A web page is a document or a page on the World Wide Web (www). Each web page has its unique URL. It consists of information in the form of text, images, audio, videos and hyperlinks.

(iii) Website: A website is a collection of related web pages. With the help of a web browser, we can open websites.

2. Fill in the blanks:

(a) Web pages

(b) < , >

(c) <HEAD>…</HEAD>

(d) Title bar

(e) Hypertext Transfer Protocol (HTTP)

3. Tick (✓) the correct option:

(a) (iii) <H3> text heading </H3>

(b) (ii) 6 levels

(c) (ii) META
(d) (iii) TOPMARGIN
(e) (ii) Google Chrome
(f) (i) SUBSCRIPT
(g) (iv) <P>...</P>
(h) (iii) <Head>...</Head>
(i) (iv)
(j) (iii) <META> and <TITLE>

4. Match the following:

(a) (vii) Client
(b) (iv) Server
(c) (v) Protocol
(d) (vi) Web pages
(e) (i) HTML
(f) (viii) Tag with angular brackets
(g) (x) <BODY>...</BODY>
(h) (ix) Cascading Style Sheets
(i) (ii) Line break tag
(j) (iii) Paragraph tag

5. Write T for true and F for false statement:

(a) T	(b) F	(c) F	(d) T	(e) F
(f) F	(g) T	(h) F	(i) F	(j) T

6. Application-based Questions

(a) HTML: HyperText Markup Language
(b) CSS: Cascading Style Sheets
(c) Heading tag: <H1>
(d) Anchor tag: <A>
(e) BGCOLOR

Chapter 6
Introduction to Adobe Express

1. Answer the following questions:

(a) Adobe Express is used to create posters, videos and even logos without being an artist. Adobe Express is like a magic art box on our computer or phone. It is like our personal art assistant that helps us to create amazing things easily and quickly. It has lots of ready-made designs known as templates. We can add pictures from Adobe's collection and use different fonts to make our work look professional.

(b) The key features of Adobe Express are:

(i) Templates (ii) Background Remover
(iii) Stylish Fonts (iv) Image Library
(v) Collaboration (vi) Direct Social Media Sharing
(vii) Quick Actions (viii) Ease of Use

(c) The welcome message on the home screen of Adobe Express is like a friendly greeting that we see when we open the app or website. It is designed to make us feel comfortable and excited about creating something new.

For example, when we log in to Adobe Express, we see a message that says,

Welcome 'name',

Social posts, flyers, videos—make whatever you like for free.

(d) Template is a pre-made outline for creating something. It is like a map that helps us draw a picture or write a story. It already has some lines or shapes and we just add our own ideas and complete it. It is a quick way to make something nice without starting from zero.

(e) An Instagram post is like adding a new photo or video to the digital photo album. Instagram posts help us in:

(i) Sharing Moments (ii) Expressing Ourselves
(iii) Staying Connected (iv) Learning
(v) Inspiring Others

2. Fill in the blanks:

(a) Social Post (b) Navigation bar
(c) Instagram (d) Logo
(e) Flyer

3. Match the following:

(a) (vii) (b) (iv) (c) (ii) (d) (vi) (e) (iii)
(f) (ix) (g) (x) (h) (i) (i) (v) (j) (viii)

4. Write T for true and F for false statements:

(a) F (b) T (c) T (d) F (e) T

(f) T (g) F (h) T (i) T (j) T

5. Tick (✓) the correct option:

(a) (i) Flyer

(b) (iv) Presentation

(c) (iv) Online classes

(d) (iii) Templates

(e) (i) Background Remover

(f) (iv) All of these

(g) (ii) Quick Actions

(h) (i) Welcome Message

(i) (iii) Your stuff

(j) (i) Schedule

Chapter 7
More on Adobe Express

1. Answer the following questions:

(a) A video is a way to record and show moving images, like a movie or a clip we watch on our phone or computer. It is made up of lots of pictures that change fast, so it looks like things are moving.

(b) An Instagram Story is like a temporary photo or video message that we can post on Instagram.

(c) Following are the features offered by Adobe Express for enhancing Instagram story:

(i) Templates (ii) Customization

(iii) Animation (iv) Fonts and Colors

(v) Music and Audio (vi) Easy Sharing

(d) A YouTube thumbnail is a small picture that acts like a book cover for a video. It shows up before we click on the video and gives us an idea of what the video is about. It is important because it helps people decide if they want to watch the video.

(e) A web page is a document on the internet that we can look at using a web browser, like Chrome or Safari. It is made with HTML, which is a special code that tells the browser what to show. Web pages can have text, pictures, videos and links to other pages.

The features offered by Adobe Express for creating a web page are as follows:

(i) Professional Templates (ii) Customizable Features
(iii) Instant Responsive Design (iv) Adobe Stock Integration
(v) Simple Drag-and-Drop Interface (vi) One-Page Format
(vii) Free Hosting by Adobe (viii) Shareable Content

2. Fill in the blanks:

(a) Templates (b) HTML
(c) YouTube Studio (d) Thumbnail
(e) Instagram Story

3. Match the following

(a) (iii) (b) (v) (c) (vi) (d) (viii) (e) (vii)
(f) (ix) (g) (x) (h) (iv) (i) (i) (j) (ii)

4. Write T for true and F for false statements:

(a) T (b) T (c) F (d) T (e) F
(f) T (g) F (h) T (i) T (j) F

5. Tick () the correct option:

(a) (i) Webpage
(b) (iii) URL
(c) (ii) Theme
(d) (i) Drag-and-drop
(e) (ii) Thumbnail
(f) (i) JPEG
(g) (iii) Story
(h) (ii) Adobe Stock Videos
(i) (i) Studio
(j) (iii) Animation

Chapter 8
Database and DBMS—An Introduction

1. Answer the following questions:

(a) A database is an organized collection of structured information, or data, typically stored electronically in a computer system.

(b) RDBMS stands for Relational Database Management System. RDBMS is a type of DBMS in which the database is organized and accessed according to the

relationship between data values of fields in tables. Tables in the database are related to each other with the help of a common identified field. The connection between such tables is called **relation**. Access 365 is an example of RDBMS.

(c) Following are the contents of a table:

- **Data Fields:** Columns are known as data fields or just fields. Each field contains data of one type. It is a good practice to name the field according to the data it will hold. For example, in a students table, we can have fields like Roll Number, Student's Name, Class and Section which are self-explanatory.
- **Records:** Data in a single row is known as a record. A record gives complete information about a unit. For example, a record gives details of a student.
- **Data Item:** Data stored in one cell is known as a data item. All the data items in a single row form a record.
- **Primary Key:** The column 'Roll Number' has unique values. No two students can have the same roll number in a school. It is important to have a field that uniquely identifies a record in a table. A field that stores such unique values is termed as the Primary Key field. Once we define a field as a primary key, Access ensures no two data items in that field can contain the same value in that table.

(d) **Primary Key**—In a table, we should have one or more fields whose value(s) uniquely identify a record. Such a field (or set of fields) is known as the Primary key for a table. Primary key cannot have a null value (undefined value).

Primary Key	Foreign Key
Primary key uniquely identifies a record in a table.	Foreign key is a field in the table, that is, primary key in another table.
Primary key can't accept null values.	Foreign key can accept multiple null values.
We can have only one primary key in a table.	We can have more than one foreign key in a table.

(e) Access provides us with an important feature which helps us in retrieving data from one or more tables. We can write a query statement by providing select or search conditions to get the desired data from multiple tables.

Queries are of the following types:

(i) Simple Query: Simple query is the select query. It gets data from one or more tables and the result is displayed in datasheet view.

(ii) Crosstab Query: Used for calculation and restructuring of data for better analysis.

(iii) Find Duplicates Query: This query finds duplicate records within a single table or previously created query.

(iv) Find Unmatched Query: This query is created to find records in one table that do not match records in a related table.

(f) (i) **Form**—Form is a graphical representation of a table. We can add, update and delete records in a single table or multiple tables using a form. We can manipulate the same information either through forms or directly in the table. If we change a record in a form, it will be changed in the table. Data is stored in a table and form is just a graphical representation of that. Form displays only one record on the screen while the navigation button is there to retrieve all records.

(ii) **Queries**—Access provides us with an important feature which helps us in retrieving data from one or more tables specified by some conditions. We can write a query statement by providing select or search conditions to get desired data from multiple tables.

(iii) **Table**—Access allows us to have one or more related tables in a database. Every table must have a table name. Following are the contents of a table:

- *Data Fields:* Columns are known as data fields or just fields. Each field contains data of one type. It is a good practice to name the field according to the data it will hold. For example, in a students table, we can have fields like Roll Number, Student's Name, Class and Section which are self-explanatory.
- *Records:* Data in a single row is known as a record. A record gives complete information about a unit. For example, a record gives details of a student.
- *Data Item:* Data stored in one cell is known as data item. All the data items in a single row form a record.

(iv) **Report**—A report is an effective way of presenting data as information either on screen or in a printed format. We can arrange the fields on the report and can display the information the way we want to see it.

(v) **Master Table** – A master table is a table which holds a single record for an entity. The data is relatively permanent in a master table.

(vi) **Transaction Table** – In a transaction table, multiple records of same data can exist. The transactions are the activities performed on the master tables. These activities are recorded in the transaction tables.

(vii) **Referential Integrity** – Referential Integrity is a system of rules that ensures that relationships between related tables are valid and no records are deleted or changed accidentally.

2. Fill in the blanks:

(a) Data redundancy
(b) Relational Database Management System
(c) Reports
(d) Data item, record
(e) Primary key
(f) Foreign key
(g) .ACCDB
(h) Redundancy, inconsistency
(i) Form, tables
(j) Navigation pane
(k) Datasheet

3. Tick (✓) the correct option:

(a) (i) DBMS

(b) (iii) Data Redundancy

(c) (ii) Authorization Check

(d) (i) Storage containers

(e) (iv) Forms

(f) (iv) Referential Integrity

(g) (ii) Relationship Section and Selection Criteria Section

(h) (iii) Data Field, Data item, Records

(i) (i) Query

(j) (iv) Defining purpose of database

4. Application-based Questions

(a) Team_ID or Team_Name

(b) Product_ID, Product_Name, Price, Quantity, Brand_Name, Supplier

(c) Book_Name or Book_ID or ISBN_Code or Book_Code

(d) Simple Query

(e) With the help of foreign key and by establishing one-to-many relationship between these two tables.

Chapter 9
Audio-Visual Communication

1. Fill in the blanks:

(a) Information

(b) Audio-Visual

(c) OpenShot

(d) Quick Access Toolbar

(e) Three function tabs

(i) Project Files

(ii) Transitions

(iii) Effects

(f) Preview window

(g) Timeline

(h) CTRL + S

(i) .osp

(j) Exporting

2. Tick (✓) the correct option:

(a) (i) Project Files Pane

(b) (iii) Quick Access Toolbar

(c) (iv) Zoom Slider

(d) (i) Imported

(e) (iv) Preview Window

(f) (iii) Edit

(g) (ii) Smooth fade between images

(h) (iii) 

(i) (iv) .osp

(j) (i) Single video file

3. Write T for true and F for false statements:

(a) F	(b) T	(c) T	(d) T	(e) F
(f) T	(g) T	(h) F	(i) F	(j) T

5. Application-based Questions

(a) Audio tab

(b) Preview window

(c) (i) Import Media

(ii) Drag to Timeline

(iii) Trim & Edit

(iv) Add Effects & Transitions

(v) Adjust Audio

(vi) Preview the Video

(vii) Export the Video

(d) Timeline

(e) (i) Import Media

(ii) Drag & Drop to Timeline

(iii) Trim & Adjust

(iv) Add Transitions

(v) Preview & Export

Chapter 10
Program Coding

1. Answer the following questions:

(a) (i) **Code:** Computer code, also known as program code, is the set of instructions written in any programming language. A computer can execute this code or program.

(ii) **Program:** A computer program is a sequence of instructions written using a Computer Programming Language to perform a specified task by the computer.

(iii) **Programming Language:** Specially designed languages used to write the commands are known as Programming languages. These languages help us to communicate with the computer language, *i.e.*, the machine language. The various programming languages, some of which are in use today, are BASIC, QBASIC, Visual Basic, C, C++, VC++, Java, etc.

(iv) **Execute:** Execution is a process by which we can execute the programs to obtain the desired result.

(b) Programming involves the following activities:

(i) Problem analysis

(ii) Understanding of the problem

(iii) Generating algorithms

(iv) Implementation, *i.e.*, coding of algorithms in a target programming language

(v) Testing

(vi) Maintenance

(c) The basic components of a program are:

(i) Identifiers (ii) Literals

(iii) Data types (iv) Operators

(v) Loops (vi) Decision-making

(d) Naming conventions are the set of rules for choosing the character sequence to be used for identifiers. Following are the naming conventions to be followed:

(i) The first character must be a letter.

(ii) Names can have alphabets and numbers in any sequence.

(iii) The underscore (_) counts as a letter.

(iv) The alphabets or names cannot contain a space.

(v) Upper case letters are different from lower case letters, *i.e.*, it is case sensitive.

(vi) Identifier name cannot start with a number.

(vii) The name cannot contain special characters other than A-Z, a-z or underscore.

(viii) Keywords cannot be used in names. Keywords are the special words which are reserved and have special meaning.

(e) Literals are the constants that never change their value during program execution. Literals are of the following types:

(i) **Boolean:** Boolean means the value is either true or false. True means 1 and False means 0.

For example:

X = False

Where X is a variable and false is a constant.

(ii) **Integer:** Integer constants are whole numbers. The integer constant cannot have decimal values.

For example:

X = 4

Where X is a variable and 4 is a constant.

(iii) **Character:** Character constants can contain only one character, enclosed within single quotes.

For example:

X = 'a'

Where X is a variable and 'a' is a constant.

(iv) **Floating:** These are also known as real constants because these numbers can be in decimal. Real constant must have at least one digit before decimal and one digit after decimal.

For example:

X = 4.6

Where X is a variable and 4.6 is a constant.

(v) **String:** String constants are multi characters, enclosed within double quotes.

For example:

X = "Computer"

Where X is a variable and "Computer" is a constant.

2. Fill in the blanks:

(a) Data types are of two types:

(i) Fundamental

(ii) Derived

(b) Computer memory locations
(c) Initializing
(d) Reliable, robust, usable, portable
(e) Operators are of the following types:
  (i) Arithmetic
  (ii) Relational
  (iii) Logical
(f) Modulus
(g) Logical
(h) NOT
(i) Assignment
(j) Compilation

3. Write T for true and F for false statements:

(a) F (b) T (c) T (d) F (e) F
(f) F

4. Match the following:

(a) (iv) Problem-solving technique
(b) (v) =
(c) (vi) !
(d) (vii) &&
(e) (viii) ||
(f) (ix) >=
(g) (x) %
(h) (ii) *
(i) (i) /
(j) (iii) Numbers with decimal point

5. Tick (✓) the correct option:

(a) (i) 1
(b) (ii) Single
(c) (iii) Derived
(d) (iii) Initialize
(e) (i) =
(f) (iv) Modulus
(g) (ii) >=

6. Application-based Questions

(a) Relational/Comparison Operator

(b) Looping Statements: *for* or *while*

(c) Decision-making/Conditional Statements: *if, elif* or *else*

(d) Arithmetic Operator (Modulus %)

(e) *for* loop

7. Machine Room Exercise:

(a)

```
Begin
Numeric percentage
In put percentage
If percentage > 95%
        Display "Grade A1"
Else if percentage < 94 && percentage > 85
        Display "Grade A"
Else if percentage < 84 && percentage > 75
        Display "Grade B1"
Else if percentage < 74 && percentage > 65
        Display "Grade B"
Else if percentage < 64 && percentage > 55
        Display "Grade C1"
Else if percentage < 54 && percentage > 45
        Display "Grade C"
Else if percentage < 44 && percentage > 35
        Display "Grade D"
Else if percentage < 34
        Display "Grade F"
End
```

(b)

```
Begin
Numeric Age
Input Age
If the Age >= 14
        Display "Yes, The user is the student of class VIII."
Else
Display an error message.
```

(c)

```
Begin
Numeric Num1, Num2
Input Num1, Num 2
```

```
If Num1 = Num2
        Display "Num1 and Num2 are equal"
Else if Num1 > Num2
        Display "Num1 is greater than Num2"
Else
        Display "Num2 is greater than Num1"
End
```

(d)
```
Begin
Numeric WeekNum
Input WeekNum
If WeekNum = 1
        Display "Monday"
If WeekNum = 2
        Display "Tuesday"
If WeekNum = 3
        Display "Wednesday"
If WeekNum = 4
        Display "Thursday"
If WeekNum = 5
        Display "Friday"
If WeekNum = 6
        Display "Saturday"
If WeekNum = 7
        Display "Sunday"
End
```

Chapter 11
More about Python

1. Answer the following questions:

(a) Python is a general-purpose programming language that can be used to build any kind of program. It is very simple, flexible and easy to understand. Python is widely used across the platforms. It is used to build not only desktop applications, web applications but also mobile applications.

(b) Comment is the text added by the programmer while writing a code. Proper comments make code maintenance easier. They generally tell about the function of the code written. The compiler ignores these lines at the time of execution.

(c) Python has defined some rules to name a variable. These are as follows:

(i) A variable name must start with a letter or the underscore character.

(ii) A variable name cannot start with a number.

(iii) A variable name can only contain alpha-numeric characters and underscores (a-z, 0-9, and _).

(iv) Variable names are case-sensitive (age, Age and AGE are three different variables).

(d) Operators are used to perform various operations on variables and values.

Operators in Python are of the following types:

(i) **Arithmetic Operators:** Arithmetic operators are used with numeric values to perform mathematical calculations. For example, x + y.

(ii) **Assignment Operators:** Assignment operators are used to assign values to the variables. For example, x = 5.

(iii) **Comparison Operators:** Comparison operators are used to compare values. For example, x > y.

(iv) **Logical Operators:** Logical operators are used to combine two or more conditional statements. For example, x < 5 AND x < 10.

(v) **Identity Operators:** Identity operators compare the memory locations of two objects. For example, x is y.

(vi) **Membership Operators:** Membership operators are used to find out whether a value is a member of a sequence such as string or list. For example, x in y.

(vii) **Bitwise Operators:** Bitwise operators are used to compare binary numbers.

(e)

Identity Operator	Membership Operator
Identity operators compare the memory locations of two objects.	Membership operators are used to find out whether a value is a member of a sequence such as string or list.
Operator – is, is not	Operator – in, not in

2. Match the following operators:

(a) Arithmetic operators (+, –, *, ? %, **, //)

(b) Assignment operators (=, +=, –=)

(c) Comparison operators (==, !=, >, <, >=, <=)

(d) Logical operators (and, or, not)

(e) Identity operators (is not)

(f) Membership operators (in, not in)

3. Fill in the blanks:

(a) Variables
(b) Equal to sign (=)
(c) Comments
(d) Indentation
(e) .py or .pyw
(f) general-purpose
(g) String
(h) Arithmetic
(i) Modulus
(j) Assignment

4. Write T for true and F for false statements:

(a) T (b) F (c) F (d) T (e) F
(f) F (g) T (h) T (i) F (j) T

5. Tick (✓) the correct option:

(a) (iii) is
(b) (ii) !=
(c) (iv) Logical
(d) (iv) =
(e) (i) Increment the values with the value specified after = symbol.
(f) (i) 3*3*3*3
(g) (ii) Removed
(h) (ii) Modulus
(i) (ii) True
(j) (ii) A variable name can start with a number

6. Application-based Questions

(a) Python
(b) #
(c) By using modulus % operator to check the divisibility.
(d) Relational/Comparison Operator
(e) Text type – str

Chapter 12
Types of Artificial Intelligence

1. Answer the following questions:

(a)

Strong AI	Weak AI
It can do anything that a human can do.	It can only focus on a few tasks at hand.
It learns from its own experience and makes its own decisions.	It follows human commands and rules for a specific purpose.
It has self-awareness and is conscious because of which it can understand and interact with other beings.	It does not have human consciousness although it may be able to simulate it sometimes.
It does not exist yet in the real world but only in fiction.	It exists today in phones, cars, TVs, games, etc.

(b) Artificial Intelligence can be classified based on the following factors:

(a) Complexity or capabilities

(b) Functionality

(c) Here are some examples of Weak AI:

- A voice-recognition software
- An email spam filter
- A self-driving car
- A chess-playing program.

(d) (i) **Reactive machines:**

- These are the simplest type of AI.
- They only react to what is happening right now.
- They do not remember anything from the past or plan anything for the future.
- They just follow a set of rules to do a specific task

(ii) **Limited-memory machines:**

- These are machines that can store some information for a short period of time.
- They use this information to improve their performance on a task.
- For example, a self-driving car is a limited-memory machine. It can remember things like the speed and distance of other cars, traffic lights and road signs. It uses this information to drive safely and smoothly.

(iii) **Theory-of-mind machines:**

- These are machines that can understand the thoughts and feelings of other beings.
- They can interact with them in a natural and social way.
- For example, a robot that can talk to a human and understand their emotions is a theory-of-mind machine. It can also express its own emotions and preferences.

(iv) **Self-aware machines:**

- These are machines that can be aware of themselves and their surroundings.
- They can have their own goals and opinions.
- They can also learn from their experiences and improve themselves.
- For example, a robot that can recognize itself in a mirror and make decisions based on its own interests is a self-aware machine.

(e) Some fictional examples of Strong AI are:

(i) HAL 9000 from the movie *2001: A Space Odyssey*.

HAL 9000 is a supercomputer that controls the spaceship and communicates with the crew.

(ii) WALL-E from the movie *WALL-E*.

WALL-E is a robot that collects and compacts trash on the earth after humans have left the planet.

2. Fill in the blanks:

(a) Artificial General Intelligence (AGI) or Generalized AI

(b) intellectual

(c) Strong AI programs

(d) Chess-playing program, self-driving cars

(e) Narrow AI

(f) weak

(g) HAL 9000, WALL-E

(h) Limited-memory machines

(i) Theory-of-mind machines

(j) Self-aware machines

3. Write T for true and F for false statements:

(a) T (b) T (c) F (d) F (e) T

(f) F (g) F (h) T (i) T (j) T

4. Tick (✓) the correct option:

(a) (i) A calculator that can perform mathematical functions quickly.

(b) (iv) All of these

(c) (i) Reactive

(d) (ii) Limited-memory

(e) (iii) Theory-of-mind

(f) (iv) Self-aware

(g) (ii) It can follow human commands and rules for a specific purpose.

(h) (iii) WALL-E from the movie *WALL-E* that collects and compacts trash on the earth after humans have left the planet.

(i) (i) They can perform tasks faster and more accurately than humans.

(j) (ii) A calculator that can perform mathematical calculations quickly.

6. Application-based Questions

(a) Weak AI or Narrow AI

(b) Strong AI

(c) Theory-of-mind machines

(d) If robots could do everything, life would be very different. People would have more time for fun and learning. Robots would help in schools, hospitals and even make art and music. They would also keep us safe. However, there might be risks like hacking.

(e) AI should be fair, safe and clear. Humans must control it, protect privacy and use it for good to help society.

Chapter 13
Latest Technologies–The Game Changer

1. Answer the following questions:

(a) (i) **Virtual Reality:** It is a simulated 3D digital world that we can explore, such as a video, a game or a simulation system, by wearing a VR headset or head-mounted display to get a 360-degree view of an artificial world that makes our brain believe that we are in a different reality.

(ii) **Extended Reality:** Technologies that can create, alter or enhance the perception of reality by using computer-generated simulations, models or environments are known as Extended Reality (XR).

(iii) **Augmented Reality:** It is a technology that adds digital information, like images, sounds, or videos, to the real world around you, by making use of devices like smartphones, tablets, or special glasses to superimpose this extra content onto what you see in real life.

(iv) **Mixed Reality:** Mixed Reality (MR) is a technology that blends both the real world and the digital world together, allowing them to interact with each other. It allows us to manipulate virtual objects in the real world or see real objects in a virtual environment.

(b)

Virtual Reality	Augmented Reality
It completely replaces the real world with a virtual one.	It adds virtual elements to the real world.
It can be experienced through VR headsets or goggles.	It can be experienced through smartphones, tablets, or AR glasses.
We can see only a computer-generated, virtual world.	We can see both the real world and digital objects are superimposed.
There is no interaction with the real world.	It helps us interact with and enhance the real world.
For example, playing a game where you feel like you are inside the game world.	For example, using an app to see a virtual animal walking on your desk.

(c) Virtual Reality (VR) is used in the following fields:

(i) **Education:** VR can make learning more interactive and effective by allowing us to access information, visualize concepts or practise skills. For example, Google Expeditions (however this is not in use anymore), Body VR, etc.

(ii) **Healthcare:** VR improves healthcare by enhancing diagnosis, treatment, training and therapy. For example, Psious, virtual reality medical centre, etc.

(iii) **Gaming:** VR can make games more interactive and engaging by allowing us to explore virtual world or interact with digital characters. For example, *Half life: Alyx2, Beat Saber3,* etc.

(iv) **Tourism:** VR can enhance the travel experience by allowing us to visit distant places, learn about cultures or discover new attractions. For example, Google Earth VR, Ascape VR, etc.

(d) Augmented Reality (AR) is used in the following fields:

(i) **Education:** AR can make learning more engaging and interactive by providing personalized content. For example, exploring historical sites, viewing 3D models of human anatomy, etc.

(ii) **Healthcare:** AR can improve the quality and efficiency of healthcare services by providing accurate and timely information. For example, visualizing medical images, monitoring patients' health, etc.

(iii) **Gaming:** AR allows us to interact with digital characters and we can explore the real world. For example, Pokémon Go, Harry Potter: Wizards Unite, etc.

(iv) **Tourism:** AR can enrich the travel experience and cultural awareness by providing more information and interaction. For example, virtual tour guides, AR maps, etc.

(e)

Virtual Reality	Augmented Reality	Mixed Reality
Creates a completely virtual world.	Adds digital elements to the real world.	Blends the real world with interactive digital elements.
Experienced through VR headsets or goggles.	Experienced through smartphones, tablets or AR glasses.	Experienced through specialized headsets, glasses or AR devices.
No interaction with the real world.	You can still see and interact with the real world.	Real-world objects interact with virtual elements.
Only a computer-generated, virtual world.	Real world with digital objects superimposed.	A combination of real-world and digital elements, which interact with each other.
For example, VR gaming like Oculus Rift, virtual tours, etc.	For example, Pokémon GO, AR learning apps, etc.	For example, Microsoft HoloLens, AR-based industrial training, etc.

2. Fill in the blanks:

(a) virtual, augmented

(b) Microsoft HoloLens, Magic Leap

(c) 25%, 75%

(d) Augmented Reality

(e) Google Expeditions, Body VR

3. Match the following:

Virtual Reality	Augmented Reality
Ascape	Pokémon Go
Psious	Harry Potter: Wizards Unite
Google Expeditions	
Half-Life: Alyx	
Visualize medical images	
Navigate unfamiliar places	

4. Write T for true and F for false statements:

(a) F (b) F (c) T (d) F (e) T

(f) T (g) T (h) T (i) T (j) F

5. Tick (✓) the correct option:

(a) (ii) Extended Reality

(b) (i) Virtual Reality and Augmented Reality

(c) (ii) Virtual Reality

(d) (iii) Headset

(e) (i) Smartphone

(f) (iv) All of these

(g) (i) Pokémon Go

(h) (iv) XR

(i) (iii) MR

(j) (iv) Glasses

6. Application-based Questions

(a) Virtual Reality

(b) Augmented Reality

(c) Virtual Reality

(d) Ankit can use Extended Reality (XR) to visualize and test his product before manufacturing by creating a 3D model using Virtual Reality (VR) and Augmented Reality (AR).

(e) Rachit is having an immersive Virtual Reality (VR) experience. The VR headset makes him feel like he is inside the game, allowing him to see, hear and interact with the virtual world as if it were real.