**Class 8**

**Chapter -4**

**Algorithm and Flowchart**

**A. Tick (✔) the correct option.**

1. Algorithm is a \_\_\_\_\_\_ of steps to perform a task.  
   👉 **c. Sequence**
2. Which of the following is not a characteristic of algorithm?  
   👉 **c. Compressibility**
3. Which of the following statements is true?  
   👉 **b. A decision box can have two exit points**
4. Which of the following symbols will you use to represent addition of two numbers?  
   👉 **c. Process**
5. Eating food is a process of  
   👉 **c. Loop Construct**

**B. Write T for True and F for False.**

1. An algorithm is a graphical representation of the steps used to solve a problem.  
   👉 **F** (That’s a flowchart, not an algorithm.)
2. A connector is used to connect two different parts of a flowchart.  
   👉 **T**
3. The direction of flow of data in a flowchart is from bottom to top.  
   👉 **F** (It is from top to bottom or left to right.)
4. When an algorithm is executed, it should terminate after a certain or finite number of steps.  
   👉 **T**
5. An algorithm can be converted into a program.  
   👉 **T**

**C Write the functions of the following Flowchart symbols:**

1. **Start/Stop (Ellipse):** Indicates the beginning or end of a flowchart.
2. **Input/Output (Parallelogram):** Used to take input from the user or display output.
3. **Process (Rectangle):** Represents a process or action to be performed.
4. **Decision (Diamond):** Used to check a condition; has two outputs (Yes/No).
5. **Connector (Circle):** Connects two different parts of a flowchart.

**D. Answer the following.**

**1. What do you understand by the term loops? How do you represent loops in algorithms and flowcharts? Explain with an example.**

👉 A **loop** is a process in which a set of instructions is repeated multiple times until a condition is met.

* **In Algorithm:** we use steps like “Repeat until condition” or “Go to Step X.”
* **In Flowchart:** a decision box checks the condition, and arrows loop back to repeat steps.

**Example (Print numbers 1 to 5):**

* Algorithm:
  1. Start
  2. Set A = 1
  3. Print A
  4. A = A + 1
  5. If A ≤ 5, go to Step 3
  6. Stop
* Flowchart: A loop with a decision diamond checking if A ≤ 5.

**2.State the significance of using a flowchart.**

* Flowcharts provide a clear **visual representation** of problem-solving steps.
* They make it easier to **understand, analyze, and debug** algorithms.
* Help programmers to **communicate logic** effectively before coding.
* Reduce errors by planning properly.

**3.Briefly explain the limitations of an algorithm.**

* Writing an algorithm takes **time**.
* Difficult to represent **branching and loops** in simple text form.
* When there are **too many steps**, algorithms become lengthy and hard to understand.

**4 Write an algorithm to find the area of a rectangular field.**

**Algorithm:**

Print Area

Take input length (L)

Take input length (L)

Step-1: Start

Step2: Take input length (L)

Area = L × B

Step-3: Take input breadth (B)

Step-4: Area = L × B

Step-5: Print Area

Step-6: Stop

**5. Draw a flowchart to check if a given letter is a vowel or not.**

Input a letter

Is Letter a,e,i,o,u?

yes

no

Print it is vowel

Print it is NOT vowel

**Algorithem (description):**

**Step-1: Start**

**Step-2:** Input a letter

**Step-3:** Decision: check, is the letter = A, E, I, O, U (or a, e, i, o, u)?

**Step-4: IF Yes →** Print "Vowel"

**Step-5: IF No →** Print "Not a vowel"

**Step-6: Stop**

**Some extra questions**

**Fill in the Blanks (with Answers)**

1. A set of instructions to solve a problem is called an **algorithm**.
2. A **flowchart** is the graphical representation of an algorithm.
3. The **ellipse** symbol is used to represent Start and Stop in a flowchart.
4. A **rectangle** is used to show processing in a flowchart.
5. A **parallelogram** is used to take input or display output in a flowchart.
6. A **diamond** shape in a flowchart is used to represent a decision.
7. An algorithm should always terminate after a **finite** number of steps.
8. Every algorithm must produce at least one **output**.
9. The arrows in a flowchart are called **flow lines**.
10. A **connector** is used to join two different parts of a flowchart.
11. The process of repeating steps in an algorithm is called a **loop**.
12. Eating food step-by-step is an example of a **loop construct**.
13. Writing an algorithm helps in finding and eliminating **errors** before coding.
14. Algorithms are not dependent on any computer **language**.
15. Flowcharts make it easier to **understand** the logic of a problem.
16. The first flowcharts were introduced by **Frank Gilberth** in 1921.
17. An algorithm is always written in a **step-by-step** manner.
18. A decision box in a flowchart has at least **two exit points**.
19. When a condition is checked in a flowchart, the two possible answers are **Yes** and **No**.
20. The three main steps in problem solving are: writing an algorithm, creating a flowchart, and converting it into a **program**.

# Multiple Choice Questions (20)

**1.** An algorithm is a:  
a) Diagram  
b) Flowchart  
c) Sequence of steps  
d) Program  
👉 **Answer: c) Sequence of steps**

**2.** Which of the following is a graphical representation of an algorithm?  
a) Chart  
b) Flowchart  
c) Program  
d) Diagram  
👉 **Answer: b) Flowchart**

**3.** Which flowchart symbol is used to represent decision-making?  
a) Ellipse  
b) Rectangle  
c) Diamond  
d) Parallelogram  
👉 **Answer: c) Diamond**

**4.** A parallelogram in a flowchart is used for:  
a) Process  
b) Input/Output  
c) Start/Stop  
d) Connector  
👉 **Answer: b) Input/Output**

**5.** A rectangle in a flowchart represents:  
a) Decision  
b) Process  
c) Start  
d) Output  
👉 **Answer: b) Process**

**6.** Which of the following is NOT a characteristic of an algorithm?  
a) Input  
b) Output  
c) Finiteness  
d) Infinite loops  
👉 **Answer: d) Infinite loops**

**7.** The Start/Stop symbol in a flowchart is drawn as:  
a) Circle  
b) Diamond  
c) Ellipse  
d) Square  
👉 **Answer: c) Ellipse**

**8.** The arrows in a flowchart are called:  
a) Connectors  
b) Flow lines  
c) Pointers  
d) Symbols  
👉 **Answer: b) Flow lines**

**9.** An algorithm must always terminate after:  
a) A condition  
b) Finite number of steps  
c) Infinite steps  
d) Any number of steps  
👉 **Answer: b) Finite number of steps**

**10.** Which of the following introduced flowcharts in 1921?  
a) Charles Babbage  
b) Frank Gilberth  
c) Ada Lovelace  
d) Alan Turing  
👉 **Answer: b) Frank Gilberth**

**11.** A decision box always has at least:  
a) One exit point  
b) Two exit points  
c) Three exit points  
d) No exit point  
👉 **Answer: b) Two exit points**

**12.** Which symbol is used to connect different parts of a flowchart?  
a) Ellipse  
b) Connector  
c) Rectangle  
d) Arrow  
👉 **Answer: b) Connector**

**13.** The first step in problem solving is:  
a) Writing a program  
b) Writing an algorithm  
c) Drawing a flowchart  
d) Debugging the program  
👉 **Answer: b) Writing an algorithm**

**14.** Flowcharts are helpful because they:  
a) Increase errors  
b) Confuse students  
c) Simplify problem solving  
d) Replace programs  
👉 **Answer: c) Simplify problem solving**

**15.** The process of repeating a set of instructions is called:  
a) Branching  
b) Looping  
c) Sequencing  
d) Decision making  
👉 **Answer: b) Looping**

**16.** Which of the following is an advantage of algorithms?  
a) They are language-independent  
b) They are confusing  
c) They are graphical  
d) They are always short  
👉 **Answer: a) They are language-independent**

**17.** Which of the following is NOT true about flowcharts?  
a) They use symbols  
b) They show sequence  
c) They are text-only  
d) They show conditions  
👉 **Answer: c) They are text-only**

**18.** Eating food step-by-step is an example of:  
a) Decision  
b) Loop construct  
c) Flowchart  
d) Algorithm only  
👉 **Answer: b) Loop construct**

**19.** An algorithm to add two numbers must have:  
a) Only input  
b) Only output  
c) Both input and output  
d) No input  
👉 **Answer: c) Both input and output**

**20.** Which of the following is a limitation of algorithms?  
a) They are independent of language  
b) They can be converted to programs  
c) They take more time to write  
d) They are easy to understand  
👉 **Answer: c) They take more time to write**

# **True/False Questions (with Answers)**

**1.** An algorithm is a sequence of steps to solve a problem.  
👉 **True**

**2.** A flowchart is a graphical representation of an algorithm.  
👉 **True**

**3.** Every algorithm must produce more than one output.  
👉 **False** (It may produce at least one output.)

**4.** The ellipse symbol in a flowchart is used for Start and Stop.  
👉 **True**

**5.** The rectangle symbol in a flowchart is used to take input.  
👉 **False** (It is used for processing.)

**6.** Flow lines in a flowchart show the direction of the process.  
👉 **True**

**7.** Algorithms depend on computer programming languages.  
👉 **False** (They are independent of language.)

**8.** A decision box in a flowchart has only one exit point.  
👉 **False** (It has at least two exit points.)

**9.** Flowcharts can have multiple Start and Stop points.  
👉 **False** (They should have only one logical start and stop.)

**10.** The process of repeating instructions is called a loop.  
👉 **True**

**11.** Writing an algorithm helps in finding errors before programming.  
👉 **True**

**12.** The parallelogram symbol is used for input and output in a flowchart.  
👉 **True**

**13.** Finiteness means that an algorithm should end after a certain number of steps.  
👉 **True**

**14.** A connector is used to join two different parts of a flowchart.  
👉 **True**

**15.** Frank Gilberth introduced flowcharts in 1921.  
👉 **True**

**16.** In a flowchart, data flows from bottom to top.  
👉 **False** (It flows top to bottom or left to right.)

**17.** Algorithms are difficult to understand because they are written in computer code.  
👉 **False** (They are written in simple steps, language-independent.)

**18.** Eating food step by step is an example of a loop construct.  
👉 **True**

**19.** Flowcharts use shapes and symbols to represent instructions.  
👉 **True**

**20.** One limitation of algorithms is that writing them may take more time.  
👉 **True**

# **Extra Questions and Answers (10)**

**1.** Define an algorithm.  
👉 An algorithm is a step-by-step sequence of instructions to solve a problem.

**2.** Write any two characteristics of an algorithm.  
👉 (i) Finiteness – it must end after finite steps.  
👉 (ii) Definiteness – each instruction must be clear.

**3.** Which symbol is used in a flowchart to represent input/output?  
👉 A parallelogram.

**4.** What is the purpose of a decision symbol in a flowchart?  
👉 To check a condition and give outputs based on **Yes/No**.

**5.** Who introduced the first flowchart and in which year?  
👉 Frank Gilberth in 1921.

**6.** What are flow lines used for in a flowchart?  
👉 To show the direction of the flow of instructions.

**7.** Give one advantage of writing an algorithm.  
👉 It helps find and eliminate errors before converting it to a program.

**8.** Give one limitation of algorithms.  
👉 Writing an algorithm takes more time.

**9.** Write the three steps involved in solving a problem using computers.  
👉 (i) Writing an algorithm  
👉 (ii) Developing a flowchart  
👉 (iii) Converting into a program

**10.** Which flowchart symbol is used to represent the start and end of a program?  
👉 An ellipse.

# **Short-Answer Descriptive Questions (10)**

**1. What is an algorithm? Give an example.**  
👉 An algorithm is a step-by-step procedure to solve a problem.  
Example: To add two numbers:

1. Start
2. Input two numbers
3. Add the numbers
4. Display the sum
5. Stop

**2. Write any three characteristics of a good algorithm.**  
👉 A good algorithm must have:

1. **Finiteness** – it must end after a finite number of steps.
2. **Definiteness** – instructions should be clear and unambiguous.
3. **Input/Output** – it must have specified input and output.

**3. What is a flowchart? Why is it used?**  
👉 A flowchart is a diagram that uses symbols to represent the steps of an algorithm.  
It is used because it makes the logic easier to understand and helps in finding errors before programming.

**4. Explain the use of the decision symbol in a flowchart.**  
👉 The decision symbol (diamond) is used to check conditions. It has two paths, usually labeled **Yes** and **No**, which help in choosing the correct flow of execution.

**5. What are flow lines in a flowchart?**  
👉 Flow lines are arrows that show the direction of the sequence of steps in a flowchart. They connect different symbols.

**6. What is the difference between an algorithm and a flowchart?**  
👉 An algorithm is written in simple English step-by-step, while a flowchart is a graphical representation of an algorithm using symbols.

**7. Mention one advantage and one disadvantage of flowcharts.**  
👉 Advantage: Flowcharts make it easy to understand the logic of a problem.  
👉 Disadvantage: Flowcharts are time-consuming to draw and modify.

**8. Who introduced flowcharts and when?**  
👉 Flowcharts were first introduced by **Frank Gilberth in 1921**.

**9. Why are algorithms important in computer programming?**  
👉 Algorithms help in solving problems step-by-step, making programming easier, systematic, and error-free.

**10. Write the three main steps of problem solving using computers.**  
👉 The three steps are:

1. Writing an algorithm
2. Developing a flowchart
3. Converting into a program

# Long-Answer Descriptive Questions (10)

**1. Explain the term algorithm. Write an algorithm to find the largest of two numbers.**  
👉 An algorithm is a step-by-step sequence of instructions designed to solve a problem.  
Algorithm to find the largest of two numbers:

1. Start
2. Input two numbers A and B
3. If A > B, then Largest = A
4. Else Largest = B
5. Print Largest
6. Stop

**2. Write the advantages and disadvantages of algorithms.**  
👉 **Advantages:**

1. Easy to understand as they use simple English.
2. Helps to detect errors before programming.
3. Can be used for any programming language.

👉 **Disadvantages:**

1. Writing algorithms takes more time.
2. They cannot show the actual logic visually.
3. For complex problems, algorithms become lengthy.

**3. What is a flowchart? Draw and explain the basic symbols used in flowcharts.**  
👉 A flowchart is a diagram that represents an algorithm using symbols and arrows.

**Symbols:**

* **Ellipse (Oval):** Start/Stop
* **Rectangle:** Processing
* **Parallelogram:** Input/Output
* **Diamond:** Decision
* **Arrow:** Flow lines

**4. Write the differences between algorithms and flowcharts.**  
👉 **Algorithm:**

1. Written in step-by-step sentences.
2. Easy to write but difficult to visualize.
3. Language-independent.

👉 **Flowchart:**

1. Represented using symbols.
2. Easier to understand visually.
3. Takes more time to draw and modify.

**5. Write an algorithm and draw a flowchart to add two numbers.**  
👉 **Algorithm:**

1. Start
2. Input A and B
3. Sum = A + B
4. Print Sum
5. Stop

👉 **Flowchart:**  
(Start → Input A, B → Process: Sum = A + B → Output: Sum → Stop)

Input A, B

:Sum = A + B

Print Sum

**6. Write an algorithm and flowchart to check whether a number is even or odd.**  
👉 **Algorithm:**

1. Start
2. Input N
3. If N % 2 = 0, then print "Even"
4. Else print "Odd"
5. Stop

👉 **Flowchart:**  
(Start → Input N → Decision: N%2=0 → Yes: Even, No: Odd → Stop)

Input N

N%2=0

yes

no

Even

Odd

**7. Explain the importance of flowcharts in problem solving.**  
👉 Flowcharts are important because:

1. They provide a clear visual understanding of logic.
2. Easy to detect mistakes before coding.
3. Saves time in debugging.
4. Acts as a blueprint for writing programs.
5. Can be used for documentation and training purposes.

**8. Write an algorithm and flowchart to calculate the sum of the first 10 natural numbers.**  
👉 **Algorithm:**

1. Start
2. Set Sum = 0, i = 1
3. Repeat while i ≤ 10
   * Sum = Sum + i
   * i = i + 1
4. Print Sum
5. Stop

👉 **Flowchart:**   
(Start → Initialize Sum=0, i=1 → Decision: i ≤ 10 → Yes → Sum=Sum+i, i=i+1 → Loop back → No → Print Sum → Stop)

Sum=0

I=1

yes

Is i<=10

Sum=Sum+i

I=i+1

no

Print Sum

**9. Explain the limitations of flowcharts.**  
👉 Limitations:

1. Time-consuming to draw.
2. Difficult to modify once prepared.
3. Not suitable for very complex programs.
4. Sometimes becomes too lengthy.
5. Cannot represent detailed logic.

**10. Write an algorithm and flowchart to find the largest of three numbers.**  
👉 **Algorithm:**

1. Start
2. Input A, B, C
3. If A > B and A > C, then Largest = A
4. Else if B > C, then Largest = B
5. Else Largest = C
6. Print Largest
7. Stop

👉 **Flowchart:**  
(Start → Input A, B, C → Decision: A > B and A > C → Yes: A → No → Decision: B > C → Yes: B → No: C → Print Largest → Stop)

Input A,B,C

If A>B and A>C

Print A

Print B

Print B

If B>C