

S.S.R. DEGREE COLLEGE(AUTONOMOUS), NIZAMABAD
II YEAR III SEMESTER INTERNAL ASSESSMENT-I EXAMINATIONS
MATHEMATICS QUESTION BANK

Part–A: Multiple Choice Questions (5 × 1 Mark)

1. A function of two variables is generally written as:
 - A) $(y=f(x))$
 - B) $(z=f(x,y))$
 - C) $(x=f(z))$
 - D) $(y=f(z))$
 - **Answer: B**
2. In the function $(z=f(x,y))$, (x) and (y) are called:
 - A) Dependent variables
 - B) Independent variables
 - C) Constants
 - D) Parameters
 - **Answer: B**
3. Which of the following is a function of two variables?
 - A) $y=x^2+3$
 - B) $z=x^2+y^2$
 - C) $x=2y$
 - D) $y=\sin x$
 - **Answer: B**
4. The graph of a function of two variables is generally represented by:
 - A) A straight line
 - B) A plane curve
 - C) A surface in three-dimensional space
 - D) A point
 - **Answer: C**
5. The domain of a function of two variables consists of:
 - A) Only values of (x)
 - B) Only values of (y)
 - C) Ordered pairs $((x,y))$
 - D) Only values of (z)
 - **Answer: C**
6. A neighbourhood of a point $((a,b))$ is:
 - A) A single point
 - B) A set of points lying within a specified distance from $((a,b))$
 - C) A straight line
 - D) A curve
 - **Answer: B**
7. The distance used to define the neighbourhood of a point $((a,b))$ is:
 - A) $(x+y)$
 - B) $\sqrt{(x-a)^2 + (y-b)^2}$
 - C) $(x-y)$
 - D) (xy)

- **Answer: B**
- 8. An open neighbourhood of radius δ contains all points whose distance from the center is:
 - A) Equal to δ
 - B) Greater than δ
 - C) Less than δ
 - D) Zero
 - **Answer: C**
- 9. The point at the center of a neighbourhood is called the:
 - A) Boundary point
 - B) Interior point
 - C) Centre point
 - D) Exterior point
 - **Answer: C**
- 10. A deleted neighbourhood of a point excludes:
 - A) All nearby points
 - B) The centre point only
 - C) Boundary points only
 - D) No points
 - **Answer: B**
- 11. The limit of a function ($f(x,y)$) at a point exists if:
 - A) The function is defined only at that point.
 - B) The function approaches the same value along every path to the point.
 - C) The function is continuous everywhere.
 - D) The function is constant.
 - **Answer: B**
- 12. If a function has different limit values along two different paths approaching the same point, then the limit:
 - A) Exists
 - B) Is equal to zero
 - C) Does not exist
 - D) Is infinite
 - **Answer: C**
- 13. A composite function is obtained by:
 - A) Adding two functions
 - B) Multiplying two functions
 - C) Applying one function to the output of another function
 - D) Differentiating a function
 - **Answer: C**
- 14. If ($u=f(x,y)$), where ($x=x(t)$) and ($y=y(t)$), then (u) is a:
 - A) Constant function
 - B) Composite function
 - C) Linear function
 - D) Homogeneous function
 - **Answer: B**
- 15. The differentiation of a composite function is performed using the:
 - A) Product Rule
 - B) Quotient Rule
 - C) Chain Rule
 - D) Power Rule
 - **Answer: C**

16. In a composite function, the output of the _____ function becomes the input of another function.
- A) Inner
 - B) Outer
 - C) Constant
 - D) Identity
 - **Answer: A**
17. A function is said to be **implicit** if it is:
- A) Expressed directly as ($y=f(x)$)
 - B) Defined by an equation involving both dependent and independent variables
 - C) A constant function
 - D) A polynomial only
 - **Answer: B**
18. The differentiation of an implicit function is called:
- A) Ordinary differentiation
 - B) Partial differentiation
 - C) Implicit differentiation
 - D) Logarithmic differentiation
 - **Answer: C**
19. The equation ($x^2+y^2=25$) represents:
- A) An explicit function
 - B) An implicit function
 - C) A linear function
 - D) A homogeneous function
 - **Answer: B**
20. In implicit differentiation, the derivative of (y) with respect to (x) is written as:
- A) $\frac{d^2y}{dx^2}$
 - B) $\frac{dx}{dy}$
 - C) $\frac{dy}{dx}$
 - D) $\frac{d^2x}{dy^2}$
 - **Answer: C**

Part–B: Fill in the Blanks (5 × 1 Mark)

1. A function of two variables is generally denoted by ($z=f(x,y)$).
2. In ($z=f(x,y)$), (z) is called the **dependent variable**.
3. The variables (x) and (y) are called **independent variables**.
4. The graph of a function of two variables is a **surface**.
5. The set of all ordered pairs ((x,y)) for which a function is defined is called its **domain**.
6. A neighbourhood of a point consists of all points lying within a specified **distance from it**.
7. The neighbourhood of a point is usually denoted by a **radius**.
8. A neighbourhood that excludes its centre is called a **deleted neighbourhood**.
9. The distance between two points in the plane is measured using the **Euclidean distance** formula.
10. Every open neighbourhood contains infinitely many **points**.

11. The limit of a function of two variables exists only if it has the same value along every path approaching the point.
12. If different paths give different limit values, then the limit does not exist.
13. A function formed by combining two or more functions is called a composite function.
14. The differentiation of a composite function is based on the Chain Rule.
16. In a composite function, the output of the inner function becomes the input of the outer function.
17. Composite functions are commonly encountered in partial differentiation problems.
18. A function defined by an equation involving both variables is called an implicit function.
19. The process of differentiating an implicit function is called implicit differentiation.
20. In implicit differentiation, Chain Rule is used while differentiating terms containing (y).
21. The equation ($x^2+y^2=1$) represents a circle and defines an implicit function.
-

Part–C: Descriptive Question (1 × 5 Marks)

Q1. Define a **function of two variables**.

Q2. Define **neighbourhood of a point**.

Q3. $\lim_{x \rightarrow 2} (x + 5)^2$.

Q4. Define a **composite function**.

Q5. Explain the method of **implicit differentiation** and find $\frac{dy}{dx}$ for the equation $x^2+y^2=25$.