

BVM College of Management Education, Gwalior

Question Bank

BCA 101

Calculus

Unit I

Q.1 Show that

$$\lim_{(x,y) \rightarrow (0,0)} 2x^3 - y^3 / x^2 + y^2 = 0$$

Q.2 Show that

$$\lim_{(x,y) \rightarrow (0,0)} x^3 + y^3 / x^2 + y^2 = 7/5$$

Q.3 Examine the continuity of the function

$$f(x,y) = \begin{cases} xy^2 / x^2 + y^2 & , (x,y) \neq (0,0) \\ 0 & , (x,y) = (0,0) \end{cases}$$

Q.4 Show that the function $f: \mathbb{R}^2 \rightarrow \mathbb{R}$ defined by

$$f(x,y) = \begin{cases} xy / \sqrt{x^2 + y^2} & , (x,y) \neq (0,0) \\ 0 & , (x,y) = (0,0) \end{cases}$$

is continuous at the origin $(0,0)$.

Q.5 Let $f(x,y) = xy + x + y^2$ show that $f(x,y)$ is differentiable at the origin.

Q.6 show that the function $f(x,y)$ define by

$$f(x,y) = \begin{cases} x^2 \sin 1/x + y^2 \sin 1/y, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$$

Is differentiable at the $(0,0)$.

Q.7 Define a function. Explain the types of function with example.

Q.8 Let $f(x,y) = \begin{cases} x^3 - y^3 / \sqrt{x^2 + y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$

Show that $f(x,y)$ is continuous but not differentiable at the origin $(0,0)$.

Q.9 show that the function $f(x,y) = \sin x + \cos y$ is differentiable every where

Q.10 Examine whether the function

$$f(x,y) = \begin{cases} x^2 + 4y, & \text{where } (x,y) \neq (1,2) \\ 0, & \text{where } (x,y) = (1,2) \end{cases}$$

At continuous at $(1,2)$.