

1ST SEMESTER MATHEMATICS (GENERAL)

ASSIGNMENT, DSE/GE-1

TOTAL MARKS - 20

1. Consider the function $g(x) = x - [x]$, where $[x]$ denotes the greatest integer not exceeding x . Show that g is discontinuous for the integral values of x and continuous for all others. (5)

2. Examine the validity of the conditions and the conclusion of Rolle's theorem for the function $h(x) = (x-2)\sqrt{x}$ on $[0, 2]$ (5)

3. Find the values of a and b in order that
that
$$\lim_{x \rightarrow 0} \frac{x(1 - a \cos x) + b \sin x}{x^3} = \frac{1}{3}$$
 (5)

4. Examine the equality of $f_{xy}(0,0)$ and $f_{yx}(0,0)$ for the function

$$f(x,y) = \frac{xy(x^2 - y^2)}{x^2 + y^2}, \quad (x,y) \neq (0,0)$$
$$= 0, \quad (x,y) = (0,0)$$
 (5)