

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B. Sc. (Mathematics and Computing) I Semester

COURSE CODE(CREDITS): 22BS1MA111 (04)

MAX. MARKS: 15

COURSE NAME: Calculus

COURSE INSTRUCTOR: Prof. K Singh

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

Q.1 Find the following limits : (a) $\lim_{x \rightarrow 4^-} \frac{3-x}{x^2-2x-8}$ (b) $\lim_{x \rightarrow +\infty} \frac{5x^3-2x^2+1}{1-3x}$ [2]

Q.2 Find the values of x , if any, at which the function $f(x) = |x^3 - 2x^2|$ is not continuous. [2]

Q.3 Find $g'(3)$, given that $f(3) = -2$, $f'(3) = 4$ and $g(x) = \frac{2x+1}{f(x)}$. [3]

Q.4 Find the absolute maximum and minimum values of $f(x) = 2x^3 + 3x^2 - 12x$ on the interval $[-3, 2]$. [3]

Q.5 Let $f(x) = 5 + 12x - x^3$. Find the interval(s) on which f is (i) concave up (ii) concave down. Also, determine the point(s) of inflection, if any. [5]