

B.Sc Ist year

Assignment- Differential Calculus

Last date of Submission: 25/02/2019.

MM: 10

Note: All questions are compulsory.

Q1. If you had a device that could record the temperature of a room continuously over a 24-hour period, would you expect the graph of temperature versus time to be a continuous (unbroken) curve? Explain your reasoning.

Q2. Explain with the help of graph that the limit of the function $\frac{1}{x}$ at $x = 0$ does not exist whereas the limit of the function $\frac{1}{x^2}$ at $x = 0$ equals to ∞ .

Q3. Give an example of a function f that is defined on a closed interval, and whose values at the end points have opposite signs, but for which the equation $f(x) = 0$ has no solution in the interval.

Q4. Explain what the sign analyses of $f'(x)$ & $f''(x)$ tell us about the graph of the function $f(x)$.

Q5. Sketch the graph of a continuous f with stated properties:

- (a) f is concave upward on the interval $(-\infty, +\infty)$ and has no relative extrema.
- (b) f has exactly two relative extrema on $(-\infty, +\infty)$ and $f(x) \rightarrow 0$ as $x \rightarrow -\infty$ and as $x \rightarrow +\infty$.

Books suggested:

- 1) "Calculus" by Howard Anton 10th edition.
- 2) "Calculus" Volume 1 by T M Apostol.
- 3) "Introduction to Real Analysis" by R.G Bartle and Donald R. Sherbert 4th edition.

Note: Student will have to give the detail of the references for each question.

Submitted to

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