GOVERNMENT POLYTECHNIC, GAYA

Class Test Examination for 1st Semester (Group - II) Students

Course Name : Engg. Mathematics   Maximum Marks: 05

Instructor: Mritunjay Kumar Singh   Time Allowed: 01 hour

Class Test Examination: 01   Date: 18 - 09 - 2018

Note: Attempt all problems. The marks of each problem indicated in the right margin.

1. Define function. Give an example of a function which is neither Injective nor Surjective. $[\frac{1}{2} + \frac{1}{2}]$

2. Define domain and range of a function. Find the domain and range of

   $$f(x) = \sqrt{x^2 - 7x + 12}$$ $[\frac{1}{2} + 1]$

3. Evaluate the following limits.

   (a) $\lim\limits_{x \to 0} \dfrac{\sqrt{1+2x} - \sqrt{1-3x}}{x}$ $[\frac{1}{2}]$

   (b) $\lim\limits_{x \to 1} \left[\dfrac{x-1}{x^{\frac{1}{4}} - 1} \right]$ $[\frac{1}{2}]$

4. Define Limit of a function. Show that $\lim\limits_{x \to 1} f(x)$ does not exist for a function defined by

   $$f(x) = \begin{cases} x^2 - 1, & \text{if } x \leq 1 \\ -x^2 - 1, & \text{if } x > 1. \end{cases}$$

   $[\frac{1}{2} + 1]$

   OR

   Let

   $$f(x) = \begin{cases} a + bx, & \text{if } x < 1 \\ 4, & \text{if } x = 1 \\ b - ax, & \text{if } x > 1. \end{cases}$$

   If $\lim\limits_{x \to 1} f(x) = f(1)$, then find the values of a and b. $[\frac{3}{2}]$

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