

Department of Basic Sciences and Islamiat
NWFP University of Engineering and Technology, Peshawar.
Civil Engineering (Main & Bannu Campus & GIST)

Mid-Term Examination 2nd Semester Spring – 2007

Paper: **Calculus (BSI-102)**

Maximum Marks: 25

Time: 2Hrs

Note: Attempt all questions

- Q1. a. Make a Conjecture about the value of the limit $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.
- b. For what value of x is there discontinuity of $y = \frac{x^2 - 9}{x^2 - 5x + 6}$.
- Q2. a. Find the derivative of $y = (\tan x)^x$ by definition.
- b. Find $\frac{d^4 y}{dx^4}$ at $x=1$, where $y = \frac{6}{x^4}$.
- Q3. a. Find maxima and minima and point of inflection (if any) of $f(x) = x^4 - 2x^2$.
- b. Find first four terms of Maclaurin's series for $f(x) = \cos x$ in ascending power of x.
- Q4. a. Find first three terms of Taylor series for $f(x) = \sin \pi x$ about $x = \frac{1}{2}$.
- b. Evaluate $\int \log_e x \, dx$.
- Q5. a. Find the area under the curve $y = \frac{1}{(3x+1)^2}$ over the interval $[0,1]$.
- b. Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{25 - 9x^2} \, dx$.

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