EMAT101L

Engineering Calculus

Quiz Test 3

(Group 2)

Total marks: 10 Time: 15 minutes

Each question carries 2 marks.

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1. Find the value of

$$\lim_{x\to 0} \frac{\tan 8x}{\sin 4x}.$$

(a) ∞ (b) 1 (c) 2 (d) 0

2. Let

$$f(x) = \begin{cases} b-3 & \text{if } x < 1, \\ ax - b & \text{if } x > 1, \\ 1 & \text{if } x = 1. \end{cases}$$

If the function f is continuous at $x = 1$, then find the values of a and b.

(a) $a = 5, b = 4$ (b) $a = 4, b = 5$ (c) $a = 5, b = 5$ (d) cannot be determined.

3. Find the value of

$$\lim_{x\to\infty} \frac{x^2 + 2x + 3}{e^x}.$$

(a) ∞ (b) 1 (c) 0 (d) $-\infty$

4. Let $f(x) = 4x^3 - 6x^2$. Then choose the correct option.

(a) 0 is a local minima of f.

(b) 1 is a local maxima of f.

(c) 0 is a global minima of f.

(d) 1 is a local minima of f.

5. Choose the **incorrect** option.

(a) A function $f(x)$ which is differentiable at $x = a$ is also continuous at $x = a$.

(b) The function $f(x) = x^2 - 5x + 9$ is differentiable everywhere.

(c) $g(x) = \sin \dfrac{1}{x}$ is differentiable everywhere.

(d) Let f be a continuous function on the closed interval $[0, 1]$ and differentiable on the open interval $(0, 1)$. Let $f(0) = 3$ and $f(1) = 5$. Then there exists a point $c \in (0, 1)$ such that $f'(c) = 2$.