

# Final Examination

## 201-NYA-05 S06

### Calculus I - Chem. Tech./Lab Tech.

**Question 1.** Evaluate the following limits

a. (4 marks)

$$\lim_{x \rightarrow \infty} \frac{7x^{10} - x^6 - 1}{3x^{10} - 20x - 1}$$

b. (4 marks)

$$\lim_{x \rightarrow 1} \frac{\sqrt{x-3} - 2}{x-1}$$

c. (4 marks)

$$\lim_{x \rightarrow 2} \frac{3x^2 - 5x - 2}{x^2 - 4}$$

**Question 2.**

b. (5 marks)

$$\int_0^{\pi/2} \frac{2t^2}{t^3-1} dt$$

**Question 6.** (5 marks) Find the equation of the tangent to the curve  $y = x^2\sqrt{x-1}$  at  $x = 3$ .

**Question 7.** (5 marks) Find a root of  $x^3 - x - 1 = 0$  to at least four decimal places by using Newton's Method and let  $x_0 = 1.3$ .

**Question 8.** Let  $f(x) = x^3 - 3x^2 - 3x - 2$ .

a. (1 mark) Find the y-intercept of  $f(x)$ .

b. (2 marks) Find  $f'(x)$  and solve for the critical points.

c. (the y