CSCE 235 **Pretest** **Jan 12, 01**

Name : **SS#**

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Instructions: Do **ONLY** three of the following Calculus questions **AND** do **ONLY** two of the C++ (CSCE 155) questions. Show your work and explain your answers. **Do not use calculators**.

========== Calculus questions begin here. ==========

Question 1: (20 points) Find the derivative of each of the following:

(a) $f(x) = 2x^4 + \frac{6}{x^3} + e^x$.

(b) $f(x) = \frac{6}{(x+2)^3}$.

(c) $f(x) = (x^2 + 5)^6$.

Question 2: (20 points) Find the folowing integrals:

(a) $\int (3x^2 + \frac{1}{x^3})dx$.

(b) $\int \frac{1}{x+1}dx$.

(c) $\int (e^{3x} + 5)dx$

Question 3: (20 points)

(a) Find $\int_0^1 (x^2 + 5)dx$.

(b) If $f'(x) = 3x^2 + 6x$ and $f(1) = 2$, what is $f(x)$?

(c) Find the rate of change of $f(x) = e^{2x} + 5x$ at $x = 1$.

Question 4: (20 points)

(a) Let

$$G(x) = \begin{cases} x - 7 & \text{if } x > 3 \\ 5 - x & \text{if } x < 3 \\ \sqrt{555} & \text{if } x = 3 \end{cases}$$

Find the limit of $G(x)$ as $x \longrightarrow 3$.

(b) Let $f(x) = \frac{x^2 - 5x + 6}{x - 3}$. Find the limit of $f(x)$ as $x \longrightarrow 3$.

Question 5: (20 points) Let $f(x) = \frac{x^3}{3} - \frac{5x^2}{2} + 6x + 7$.

(a) Find the critical numbers of f.

(b) Find the intervals on which f is increasing and the intervals on which f is decreasing.

========== C++ questions begin here. ==========

In the following two questions assume that the given programs have no syntax/run-time errors.

Question 6: (20 points) Find MyFunc(3), where MyFunc is given below.

```
⋮
int MyFunc(int n)
{
    int i, P = 2;
    for (i = 2; i <= (2 * n + 1); i++)
        P = P * i;
    return P;
}
```

Question 7: (20 points) Find $f(4, 2)$, where f is given below.

```
⋮
int f(int u, int v)
{
    int x, t, y;
    x = u; y = v;
    while (y > 0)
    {
```

```
    t = y;
    y = x%y;
    x = t;
  }
  return t;
}
```

Question 8: (20 points) Find the errors in the following C++ function:

```
⋮
double h(double x)
{
  double w
  x = x%3
  if (x ≤ 5.5) (w = 5 * x);
  if (x > 5.5) (w = 0);
  return w;
}
```

Question 9: (20 points) Write a $C++$ function whose input is a positive integer n and whose output is the sum of the odd integers greater than or equal to 1 and less than or equal to n.

Hint: A positive integer k is odd if $MOD(k, 2) = 1$.