

Assignment (Group 6)

Calculus and Analytical Geometry

Energy and Environment - Batch 15

1. Write your understanding about limits of functions. You may take support from examples. Also solve the limit problem

$$\lim_{\theta \rightarrow 0} \frac{1 - \cos(\theta)}{\cos(\theta)}.$$

2. Why do engineering students study derivatives? Find the first order derivative of the following problem

$$f(x) = (1 - 3x^2)^{\frac{1}{3}}(\tan^{-1}(2x))$$

3. What do you mean by *definite* and *indefinite* integration? How integration is useful for engineering problems?

4. Solve the following integral

$$\int \frac{\tan(x)}{\sec^4(x)} dx.$$

5. If z is function of independent variables x and y i.e. $z = f(x, y)$, then find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ from the implicit function

$$x^2 \sin(2y - 5z) = 1 + y \cos(6zx).$$

6. Solve the double integral

$$\int_0^2 \int_0^1 x e^{xy} dy dx.$$

What do you understand from the result obtained in above double integration?