United International **University**
School of Science and Engineering
Final Assessment Trimester: Spring 2021
Course Title: Fundamental Calculus
Course Code: Math- 1151 Marks: 40
Time: **1 hour 30 minutes**
Additional Time for Uploading answer script: 15 Min.
Total Time: 1 Hour 45 minutes

Answer all the questions

1. Find the area between two curves $y^2 = x$ and $x = y + 2$ by **[10]**

i) integrating with respect to x **ii)** integrating with respect to y.

2. **a)** Evaluate the following integrals **[4]**

i). $\int \frac{dx}{\sqrt{x}\, e^{\sqrt{x}}}$ **ii)** $\int \frac{cos3x\, dx}{(1-3sin3x)^3}$

b) Evaluate the following integrals by using any suitable substitution **[6]**

i). $\int_{\sqrt{e}}^{e^2} \frac{lnx}{2x^2}\, dx$ **ii)** $\int \sqrt{2-x^2}\, dx$

3. **a)** Find $\frac{dy}{dx}$ of the following function $y = x\sqrt{x}\cos(-x) + \sec^2(x^3 - 2x + 2)$. **[5]**

b) Find $\frac{dw}{dt}$, where $w = x^2,\ x = siny,\ y = \sqrt{t}$ **[2]**

c) Find the equation of tangent line to the function $y = \frac{1}{x-2}$ at $x = -3$. **[3]**

4. In each part, evaluate the integral, given that $f(x) = \begin{cases} x - 6, & x > 0 \\ -|x + 6|, & x \le 0 \end{cases}$ **[10]**

i) $\int_{-8}^{2} f(x)dx$ **ii)** $\int_{-2}^{4} f(x)dx$