THE OPEN UNIVERSITY OF SRI LANKA
B.Sc./B.Ed DEGREE PROGRAMME - LEVEL 05
NO BOOK TEST-2023/2024
APPLIED MATHEMATICS
ADU5307 –- Numerical Methods

DURATION: ONE HOUR

Date: 03. 09. 2023 **Time: 2.30 p.m. –3.30 p.m.**

ANSWER ALL QUESTIONS.

1. Evaluate $\int_0^1 x^3\,dx$ correct up to four decimal places using Trapezoidal rule by considering five sub-intervals. Also, find the value of the integral by using analytical method. Hence find the absolute error.

2. Applying Taylor series method of fourth-order for the differential equation $y'' + xy = 0$ subjected to initial conditions $y(0) = 1$ and $y'(0) = 0.5$, evaluate the $y(0.1)$ correct to four decimal places.

3. Using Picard's method of 3rd approximation solve $y' + y = e^x$, with the initial condition $y(0) = 0$. Hence find the value of $y(0.1)$.

4. Given the initial value problem that $\frac{dy}{dx} = 3x^2 + 1$,with the initial condition $y(1) = 2$. Estimate $y(2)$, by using Euler's method when $h = 0.25$.