

The Open University of Sri Lanka  
 B.Sc. Degree Programme - Level 05  
 No Book Test-2017/2018  
 ADU5307/ADE5307 — Numerical Methods



**DURATION: ONE HOUR**

**Date: 22. 07. 2018**

**Time: 10.30 a.m. -11.30 a.m.**

**ANSWER ALL QUESTIONS.**

1. (a) A rocket is launched from the ground. Its acceleration is registered during the first 80 seconds and is given in the following table. Applying Simpson's one third rule find the velocity of the rocket, at  $t = 80$  seconds.

$t s$	0	10	20	30	40	50	60	70	80
$a m/s^2$	30	31.63	33.34	35.47	37.75	40.33	43.25	46.69	50.67

- (b) Applying Taylor series method of fourth order for the differential equation

$$\frac{dy}{dx} = x^2 - y \text{ subject to the initial condition } y(0) = 1, \text{ evaluate } y(0.1) \text{ and } y(0.2).$$

2. (a) Applying Picard's method for the differential equation  $\frac{dy}{dx} = 2x - y$  subject to the initial condition  $y(0) = 0$ , find the first three successive approximations.

- (b) Applying Euler method for the differential equation  $\frac{dy}{dx} = x^2 + 1$  subject to the initial condition  $y(1) = 2$ , evaluate  $y(2)$  in four steps.