AFE BABALOLA UNIVERSITY, ADO-EKITI, EKITI STATE, NIGERIA
COLLEGE OF ENGINEERING

BACHELOR OF ENGINEERING ASSIGNMENT III

ENG 381: Engineering Mathematics III

Session: 2019/2020 **Semester:** First **Unit:** 3 **Duration:** 7 days

Instruction: Answer all the questions.

Question 4 [20 Marks]

The model for the deformation (y) of a structural element is represented by the expression given in Equation (1):

$$x(x-1)y'' + (3x-1)y' + y = 0 \qquad (1)$$

Given that $y(0) = 0.0005\,m$ and $y'(0) = 0.0005,$ applying Leibnitz-Maclaurin Method,

(a) obtain the power series solution of the model up to and including the term in x^7,
(b) estimate the approximate deformation when $x = 5,\ 8$ and $10\,m$, and
(c) with the aid of a MATLAB *mfile* program, plot the response of the structural element for $0 \le x \le 10\,m$.