



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

BACHELOR OF ENGINEERING ASSIGNMENT II

ENG 381: Engineering Mathematics III

Session: 2019/2020

Semester: First

Unit: 3

Duration: 7 days

Instruction: Answer all the questions.

Question 1 [7½ Marks]

(1) If $y = e^{x^2+x}$,

show that

$$y'' = y'(2x+1) + 2y$$

and, hence, prove that

$$y^{(n+2)} = (2x+1)y^{(n+1)} + 2(n+1)y^n$$

Question 2 [12½ Marks]

(2) Using the Leibnitz theorem, given that

(i) $y = x^3 e^{4x}$, determine $y^{(5)}$.

(ii) $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = 0$, show that $x^2 y^{(n+2)} + (2n+1)xy^{(n+1)} + (n^2+1)y^{(n)} = 0$.