

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
 COLLEGE OF EDUCATION STUDIES
 SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
 INSTITUTE OF EDUCATION

FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
 LEVEL 400, END-OF-SECOND SEMESTER EXAMINATIONS, JUNE 2023

19TH JUNE 2023

ORDINARY DIFFERENTIAL EQUATIONS

4:40 PM - 6:00 AM

SECTION B
 (40 MARKS)

Answer any TWO questions from this section.

1.

- a. Solve the following differential equation using the method of variation of parameters:

$$x^2 y'' - 3xy' + 3y = 2x^4 e^x.$$

- b. Find all solutions of $\frac{y'}{(t^2+1)y} = 4t$

2.

- a. Using the method of undetermined coefficient, find the general solution of

$$y'' + 2y' + y = 2e^{-t}.$$

- b. Solve the IVP $y' = y + \frac{3}{y^2}, y(0) = 1$

3.

- a. Find the explicit solution of the initial value problem (IVP) $y' = \frac{4t-6t^2}{y}, y(0) = -3$.

- b. Find the integrating factor for the equation $y' = 2ty + t$, hence solve for the general solution.

4.

- a. Solve the equation $t^2 y'' - 2y = 0$.

- b. Find the differential equation that satisfied by the family of functions $y(t) = C_1 t + C_2 t^2$, where C_1, C_2 are arbitrary constants.