

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

# **UNIVERSITY EXAMINATIONS 2014/2015**

**EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE**

**SMA 2304 : ORDINARY DIFFERENTIAL EQUATIONS 1**

**DATE: AUGUST 2014 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE [COMPULSORY] AND ANY OTHER TWO QUESTIONS**

===========================================================

**QUESTION ONE [30 MARKS]**

1. Differentiate between general and particular solution of a differential equation. Hence show that the function  where c is a general solution of the differential equation.  [4 marks]
2. State the order and the degree of the differential equation

 [2 marks]

1. Verify that  is an exact differential equation and find its general solution. [6 marks]
2. Use the transformation to transform the equation  to a linear equation with constant coefficients hence solve the system. [5 marks]
3. Identify the singular and ordinary points of the differential equation.

 [5 marks]

1. (i) Define the term integrating factor [2 marks]

(ii) Show that the equation  is not exact but had an integration factor of the form .

**QUESTION TWO [20 MARKS]**

1. Prove that the transformation is  reduces the equation

 to a linear equation in u and x. Hence solve the initial value problem , y(1)=2. [10 marks]

1. Find the particular solution of the differential equation

 given that y(0) =0 and y1(0) =3. [10 marks]

**QUESTION THREE [20 MARKS]**

1. Solve the differential equation  [5 marks]
2. Solve the homogeneous equation  [6 marks]
3. Given the linear differential equation  find the general solution. [5 marks]
4. Prove that if  then  [4 marks]

**QUESTION FOUR [20 MARKS]**

1. Find the power series solution of the differential equation

 [12 marks]

1. Find the general solution of the differential equation

 [8 marks]