## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE**

**SMA 2320 : ANALYTICAL APPLIED MATHEMATICS I**

**DATE: APRIL 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND**

**ANY OTHER TWO QUESTIONS.**

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**QUESTION ONE (30 MARKS)**

(a) Show that = n [5 marks]

(b) Establish that (p, q) =  [5 marks]

(c) Find dt [5 marks]

(d) By making a suitable substitution, find  dx [7 marks]

(e) Find the general solution of the partial differential equation

(x- y-z)p + 2xyq = 2xz [8 marks]

**QUESTION TWO (20 MARKS)**

(a) Use the Laplace Transform to solve the ordinary differential equation

+ 4+ 5+ 2y = 10cost, y(0) = 0, (0) = 0, (0) = 3

[10 marks]

(b) Solve using the power series method, the differential equation

+ 4y = 0 near the ordinary point x = 0. [10 marks]

**QUESTION THREE (20 MARKS)**

(a) Solve the partial differential equation

z =  where D = ,  [10 marks]

(b) Given that 2F1 (a, b, c; x) is the hypergeometric function then show that 2=  [10 marks]

**QUESTION FOUR (20 MARKS)**

(a) Obtain the Fourier series for f(x) = on the interval 0x2

[10 marks]

(b) Find the solution of the one dimensional wave equation

=  by the method of separation of variables under the boundary conditions.

(i) u = 0 when x = 0

(ii) u = 0 when x = L [10 marks]