## 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) Define the following terms as applied to analytical applied mathematics:

1. Gamma function. [2 marks]
2. Beta function. [2 marks]

(b) Prove that (2+1) = 2(2) using definition. [6 marks]

(c) (i) Define partial differential equation (PDE). [3 marks]

(ii) State the order and degree of each equation below

[5 marks]

+ 3++5+ 4u = 0

-+3+3u = f(x,y)

(d) Prove that B(m,n) =  [12 marks]

**QUESTION TWO (20 MARKS)**

(a) Show (x) = ½ [6 marks]

(b) Show that (x) =  (x) - (x) [14 marks]

**QUESTION THREE (20 MARKS)**

(a) Classify the equations into hyperbolic, parabolic or elaptic:

1. + 3+ 4+ 5- + 4u = 2x-3y [2 marks]
2. += 0 where is a function of x and y. [2 marks]

(iii) + 5+ 3+ 4 = 0 [2 marks]

(b) Solve the wave equation using method of separation of variables:

= C2 [8 marks]

(c) Prove that

=(x)- (x) [6 marks]

**QUESTION FOUR (20 MARKS)**

(a) Show that hypergeometric function is symmetric in the parameters a and b or it does not change by the interchange of a and b.

[8 marks]

(b) Show that  [12 marks]

**QUESTION FIVE (20 MARKS)**

(a) Given (x) = 1 Find (x) [10 marks]

(b) Express (x) and (x) in terms of sine and cosine function.

[10 marks]