**TECHNICAL UNIVERSITY OF MOMBASA**

Faculty of Applied and Health Sciences

Department of Mathematics & Physics

**UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE**

**AMA 4410: PARTIAL DIFFERENTIAL EQUATIONS 1**

END OF SEMESTER EXAMINATION

**SERIES:**APRIL2016

**TIME:**2HOURS

**DATE:**Pick DateMay2016

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of five questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper. PAPER 2**

**QUESTION ONE (30 MARKS)**

1. Solve the linear PDE  (5 marks)
2. Derive a PDE by eliminating the arbitrary function  from the equation

 (6 marks)

1. Classify each of the following equations as elliptic, parabolic or hyperbolic
   * 1.  (2marks)
     2.  (2marks)
2. Find the general solution of  [7 Marks]
3. Find the equation of the surface satisfying the equation 

and passing through . [8 marks]

**QUESTION TWO (20 MARKS)**

1. Find the complete integral of  using the Jacobi’s method.    (10 marks)
2. Use Charpit’s method to find the complete integral of  (10 marks)

**QUESTION THREE (20 MARKS)**

1. Derive a PDE by eliminating the arbitrary constants  and from

 . (5 marks)

1. A string of length is stretched between points  and  on the  axis. At time  it has a shape given by  and it is released from rest. Find the displacement of the string at any latter time. (15 marks)

**QUESTION FOUR (20 MARKS)**

1. Solve the heat conduction equation  , k =constant subject to the following boundary conditions:  [12 Marks]
2. Solve  [8 Marks]

**QUESTION FIVE (20 MARKS)**

1. Show that the orthogonal trajectories on the hyperboloid  of a conic in which it is cut by the system of planes  are the curves of intersection with the family of surfaces where  is a parameter.          (13marks)

Find the integral curves of the equations  (7 marks)