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**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE**

**UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF EDUCATION SCIENCE/BACHELOR OF SCIENCE(ACTUARIAL SCIENCE WITH IT)**

**4TH YEAR 1STSEMESTER 2016/2017 ACADEMIC YEAR**

**MAIN CAMPUS**

**COURSE CODE: SMA 405**

**COURSE TITLE: PARTIAL DIFFERENTIAL EQUATIONS I**

**EXAM VENUE: STREAM:**

DATE: EXAM SESSION:

TIME: 2.00 HOURS

**Instructions:**

1. **Answer question one (compulsory) and any other two questions.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**QUESTION ONE(COMPULSORY)**

1. State the order and degree of the partial differential equations given below
2. 
3.  (4 marks)
4. Define the following
5. Pfaffian differential equation
6. Quasi-Linear differential Equation
7. Semi-linear partial differential equation (6 marks)
8. Solve the simultaneous Differential equation

 (6 marks)

1. Solve the following differential equations by inspection
2. 
3.  (4 marks)
4. Given two simultaneous equations and  where *P1,Q1,R1,P2,Q2* and *R2* are functions of *x, y* and *z* show that simultaneous pair can be expressed in the form  (6 marks)
5. By eliminating the arbitrary constants *a* and *b* from  form a partial differential equation (4 marks)

**QUESTION TWO (20 marks)**

1. Find such that the Pfaffian differential equation is integrable hence solve it. (9 marks)
2. Use Lagrange’s method to solve  (5 marks)
3. Find the orthogonal trajectory on a concoid of conics in which it is cut by systems of planes  (6 marks)

**QUESTION THREE (20 marks)**

1. Show that the equation  and  are compatible hence find their solution. (9 marks)
2. Solve  (6 marks)
3. Form a partial differential equation by eliminating the arbitrary function *f* from the function  (5 marks)

**QUESTION FOUR (20 marks)**

1. Solve the homogeneous equation

 (9 marks)

1. By choosing appropriate multipliers or otherwise solve

 (6 marks)

1. Solve the Pfaffian differential equation

 (5 marks)

**QUESTION FIVE (20 marks)**

1. Solve the Cauchy’s problem for  where the initial data curve is  for  (8 marks)
2. Use Charpit’s method to find the complete integral of  (12 marks)