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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2018/2019 ACADEMIC YEAR FOUR**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES**

**FOR THE DEGREE OF BACHELOR OF EDUCATION**

**COURSE CODE: MAT 418**

**COURSE TITLE: PARTIAL DIFFERENTIAL EQUATION I**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 12/02/2020 TIME: 09.00-11.00 PM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Form a partial differential equation of all spheres of radius , having the centre in  plane **(5 marks)**
2. Find the general integral of the differential equation  **(5 marks)**
3. Find the equation of the surface satisfying and passing through  **(6 marks)**
4. Find the general integral of the differential equation 

**(6 marks)**

1. Find the complete integral of the differential equation  **(8 marks)**

**QUESTION TWO (20 Marks)**

1. (i) Write the necessary condition for the integrability of the differential equation

 where P, Q and R are functions of x, y and z. **(3 marks)**

(ii) Show that is integrable. Hence solve.

**(6 marks)**

1. Show that the complete integral of represents all possible planes through the point (2, 3, 0). Also find the envelope of all planes represented by the complete integral. **(5 marks)**
2. Find the general solution of  **(6 marks)**

**QUESTION THREE (20 Marks)**

1. Find such that  is integrable and hence solve it.

**(7 marks)**

1. Find a complete integral of the differential equation using Jacobi’s method. **(7 marks)**
2. Find the complete integral of differential equation  **(6 marks)**

**QUESTION FOUR (20 Marks)**

1. Form a partial differential equation by eliminating arbitrary function  from

  **(5 marks)**

1. Solve the differential equation  **(5 marks)**
2. Show that the equations  are compatible and find their

solution**. (10 marks)**

**QUESTION FIVE (20 Marks)**

1. Solve the differential equation  **(7 marks)**
2. Find the integral surface of which passes through the hyperbola  **(7 marks)**
3. Prove that the complete integral of the differential equation  is

**. (6 marks)**