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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2019/2020 ACADEMIC YEAR TWO**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF SCHOOL OF PURE AND APPLIED SCIENCES**

**FOR THE DEGREE OF BACHELOR OF EDUCATION**

**COURSE CODE: MAT 205**

**COURSE TITLE: ORDINARY DIFFERENTIAL EQUATION I**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 14/12/2020 TIME: 09.00-11.00 AM**

**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)**

**Q1.**  **(a)** Classify the following differential equations according to type, order and degree.

 (i)  **[2 marks]**

 (ii)  ,  is a constant **[3 marks]**

**(b)** By eliminating the constants and, obtain the differential equation for which

  is a solution. **[5 marks]**

**(c)** Solve the following by separating the variables.

  **[4 marks]**

**(d)** Solve the followinghomogeneous differential equation.

 ** [7 marks]**

**(e)** Solve the differential equation  **[4 marks]**

**(f)**  Prove that  , is a constant **[5 marks]**

**QUESTION TWO**

Q2. **(a)** Solve the following differential equation.

  **[6 marks]**

 **(b)** Solve the following differential equation by reducing it to homogeneous form.

  **[9 marks]**

 **(c)**  Solve the following exact differential equation.

  **[5 marks]**

**QUESTION THREE**

**Q3. (a)** Solve the differential equation  , given that when  and

  **[14 marks]**

 **(b)** By using appropriate substitution, solve the following differential equation

  **[6 marks]**

**QUESTION FOUR**

**Q4. (a)** Use the method of undetermined coefficient to solve

  **[15 marks]**

 **(b)** Solve the following linear differential equation.

  **[5 marks]**

**QUESTION FIVE**

**Q5. (a)**  Solve the following differential equation by the method of variation of parameters

 ** [12 marks]**

 **(b)** A boat is rowed with a velocity  directly across a stream of width. If the

velocity of the current is directly proportional to the product of the distances from

 the two banks, find the path of the boat and distance down the stream to the point

 where it lands. **[8 marks]**