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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: PHY 221/PHY 210**

**COURSE TITLE: ELECTRICITY AND MAGNETISM 11**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 11/12/2020 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 TWO (2) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. What is an alternating current (voltage)? **[2 marks]**
2. Define the following terms as applied to ac
3. Frequency **[2 marks]**
4. Phase **[2 marks]**
5. r.m.s values **[2 marks]**
6. Distinguish between the following terms
7. Average power across a pure resistance and apparent power **[4 marks]**
8. True power of a capacitor and power factor of a capacitor **[4 marks]**
9. Laplace and Poisson Equations **[4 marks]**
10. Name methods used in solving electrostatic problems **[4 marks]**
11. State the following laws
12. Conservation of charges **[3 marks]**
13. Ampere’s force law **[3 marks]**

**QUESTION TWO**

1. Find the Lorentz force on a point charge moving in a magnetic field. **[8 marks]**
2. Show that the average value ac during a half-cycle is 0.636 times the peak value of the current during the cycle. i.e,. $I\_{av}=2\frac{I\_{0}}{π}=0.636I\_{0}$  **[10 marks]**

**QUESTION THREE**

1. Stating from the Gauss’s law or otherwise, derive the Poisson and Laplace equations **[10 marks]**
2. Show that the equation of continuity is given by

 $div J+ \frac{∂ρ}{∂t}=0$, where symbols have their usual meaning.  **[10 marks]**

 **QUESTION FOUR**

* 1. Obtain an expression for power consumed across a pure resistance, i.e., the apparent power. **[10 marks]**
	2. In an LCR series ac circuit, $R=400Ω$, L = 25 mH and C = $50μF$. If the applied voltage is

 200V and$200 /πHz$. Calculate

1. Circuit impendence
2. Circuit current
3. Power factor
4. Power dissipation in the circuit. **[10 marks]**

**QUESTION FIVE**

1. State the four Maxwell’s equation in differential form **[10 marks]**
2. The addition of displacement current results in unification of electrical and magnetic phenomenon. Justify this statement **[10 marks]**