Electricity Viva: MCQs and Puzzles (50 Marks)

This document contains 20 multiple-choice questions (MCQs) worth 2 marks each (40 marks) and 5 puzzles worth 2 marks each (10 marks), totaling 50 marks. The questions cover DC and AC currents, including fundamental charges, currents, potential, capacitance, EMF, and sinusoidal wave properties. Each MCQ includes the question, options (A-D), and the correct answer. Each puzzle includes instructions and the answer for grading. Compile this LaTeX file using `latexmk -pdf` or an online LaTeX compiler like Overleaf to generate the PDF.

1 Multiple-Choice Questions (40 Marks)

1.1 1. DC Currents: Modern Concept of Electricity (24 marks)

1. The fundamental positive charge in an atom is carried by: A) Electron B) Proton C) Neutron D) Nucleus **Answer**: B

2. Free electrons are: A) Tightly bound to the nucleus B) Mobile and contribute to electric current C) Fixed in the atom's core D) Neutral in charge **Answer**: B

3. Electric current is the flow of: A) Protons B) Free electrons C) Neutrons D) Bound electrons **Answer**: B

4. Static electric charge results from: A) Movement of free electrons B) Accumulation of excess charge C) Balanced protons and electrons D) Flow of current **Answer**: B

5. Charging an object involves: A) Transfer of charge B) Removal of all electrons C) Adding protons D) Neutralizing the object **Answer**: A

6. Potential difference is measured in: A) Amperes B) Volts C) Ohms D) Coulombs **Answer**: B

7. Capacitance is the ability to: A) Store charge B) Conduct current C) Resist voltage D) Generate EMF **Answer**: A

8. The unit of capacitance is: A) Farad B) Volt C) Ampere D) Ohm **Answer**: A

9. Electromotive force (EMF) is: A) The voltage supplied by a source B) The resistance in a circuit C) The current flow rate D) The stored charge **Answer**: A

10. Bound electrons are located in: A) Outer shells and immobile B) Inner shells and fixed C) Conduction band D) Freely moving in material **Answer**: B

11. Potential is defined as: A) Work done per unit charge B) Current per unit time C) Charge per unit mass D) Force per unit distance **Answer**: A

12. Static charge can be created by: A) Friction B) Current flow C) Magnetic fields D) Chemical reactions only **Answer**: A

1.2 2. AC Currents: Sinusoidal Waveform, Frequency, Wavelength, Amplitude, Phase, Average RMS Value (16 marks)

1. A sinusoidal waveform represents: A) Alternating current voltage B) Direct current voltage C) Static charge D) Constant resistance **Answer**: A

2. Frequency of an AC wave is measured in: A) Hertz B) Volts C) Amperes D) Ohms **Answer**: A

3. The amplitude of a sine wave is: A) The peak value of the wave B) The time period C) The frequency D) The phase difference **Answer**: A

4. The RMS value of an AC wave is: A) 0.707 times the peak value B) Equal to the peak value C) Twice the peak value D) Half the average value **Answer**: A

5. The phase of a sine wave describes: A) The angular position in the cycle B) The wavelength C) The amplitude D) The frequency **Answer**: A

6. Wavelength in AC signals relates to: A) Distance traveled by the wave in one cycle B) Peak voltage C) Time period D) Charge flow **Answer**: A

7. The average value of a full AC sine wave over one cycle is: A) Zero B) Equal to RMS C) Equal to peak value D) Half the peak value **Answer**: A

8. Frequency is the inverse of: A) Time period B) Amplitude C) Wavelength D) Phase **Answer**: A

2 Puzzles (10 Marks)

2.1 1. DC Currents: Fundamental Charges (Riddle, 2 marks)

Solve this riddle: I'm negatively charged, mobile in conductors, and flow to create current. What am I? **Answer**: Electron

2.2 2. DC Currents: Capacitance (Word Scramble, 2 marks)

Unscramble the letters to find a term related to charge storage: AFOTCYRA **Answer**: Capacitor

2.3 3. DC Currents: EMF (True/False, 2 marks)

Is this statement true or false? EMF is the voltage a battery provides when no current flows. **Answer**: True

2.4 4. AC Currents: Sinusoidal Wave (Fill-in-the-Blank, 2 marks)

The AC waveform that alternates symmetrically is called a $_{wave.\textbf{Answer}:Sine}$

2.5 5. AC Currents: RMS Value (Matching, 2 marks)

Match the term to its definition: 1. RMS Value A. Effective value of an AC wave equivalent to DC **Answer**: 1-A

3 Mark Distribution Summary

- DC Currents: 30 marks (12 MCQs, 3 puzzles)
- AC Currents: 20 marks (8 MCQs, 2 puzzles)
- **Total**: 50 marks

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