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Questions/Answers

Q 1) I hereby affirm that I have viewed the class "Electrical Laws in Action: From Theory to Real-World Hardware" in its entirety. I have already or will shortly complete 1 to 2 hours of self study, research, reading, reflection and/or application of the concepts/skills presented using the AIU online library or other mediums.

A 1) Yes

Q 2) Provide a short summary of the concepts or topics you learned about today" (minimum 300 characters)

A 2) Today, I learned about fundamental electrical laws and how they apply to real-world circuits, with a special focus on Ohm's Law. I discovered two helpful ways to understand this law: the Ohm's Law triangle and the water analogy. The Ohm's Law triangle is a simple memory tool that helps to visualize the relationship between voltage (V), current (I), and resistance (R). By covering the unknown value in the triangle, you can easily determine the correct formula: $V = I \times R$ (voltage equals current multiplied by resistance), $I = V / R$ (current equals voltage divided by resistance), or $R = V / I$ (resistance equals voltage divided by current). To make these concepts even clearer, I also explored the water circuit analogy. In this comparison: Voltage is presented as a water reservoir or water pressure. A higher reservoir creates more pressure, just like a higher voltage pushes electricity harder through a circuit. Current is represented by the flow of water itself. It is the amount of water (or electric charge) that passes through the pipe each second. Resistance is compared to the pipe (or tube) that the water flows through. A narrow pipe creates more resistance, slowing down the water flow, just as a high electrical resistor reduces the electric current. Using this analogy, I explored how these three elements interact. For example, if you increase the pressure (voltage) while keeping the same pipe (resistance), the water flow (current) increases. Conversely, if you make the pipe narrower (increase resistance) with the same pressure, the flow decreases. I also explored Kirchhoff's Laws, including his Current Law (KCL), which states that the total current entering a junction must equal the total current leaving it, and his Voltage Law (KVL), which says that the sum of all voltages around a closed loop must equal zero. The main takeaway was understanding how these theoretical principles are essential for analyzing and building everything from simple LED circuits to complex electrical systems in the real world.

Q 3) What is the most important concept(s) that you gained for today's Live Class? (minimum 300 characters)

A 3) The most important concept I gained from today's Live Class is a clear and intuitive understanding of Ohm's Law and how its three components, voltage, current, and resistance, interact in a real-world circuit. What made this concept truly stick was learning it through two complementary tools: the Ohm's Law triangle and the water analogy. The water analogy was particularly impactful because it transformed abstract electrical terms into something I could easily visualize. Thinking of voltage as water pressure from a reservoir helped me understand why electricity flows. Picturing current as the actual flow of water made it clear that it represents the quantity of charge moving through the circuit. Most importantly, seeing resistance as a narrow pipe perfectly illustrated its function: just as a thin pipe restricts water flow, a high resistor restricts electric current. This analogy made the relationship instantly logical for instance, if you increase the pressure (voltage) but keep the same pipe (resistance), more water (current) will flow. Combining this visual understanding with the practical Ohm's Law triangle gave me a powerful tool for problem-solving. I now know that if I need to find voltage, I use $V = I \times R$; for current, $I = V / R$; and for resistance, $R = V / I$. This simple memory aid, rooted in a clear mental picture from the water analogy, means I can confidently analyze basic circuits. This foundational understanding of how voltage, current, and resistance relate is, for me, the most valuable takeaway, as it is the key to unlocking more complex topics in electricity and electronics.

Q 4) How would you apply what you learn today to improve your life of work? (minimum 300 characters)

A 4) As an electrical engineer, today's review of the fundamental laws of electricity, Ohm's Law, Kirchhoff's Laws, and the water analogy offers an opportunity to reflect on their application in daily professional practice and complex technical problem-solving. 1. Pedagogical Value and Technical Communication The water analogy (voltage = water pressure, current = flow, resistance = pipe constriction) remains a powerful teaching tool. In my professional environment, I can use it to: Explain electrical concepts to non-specialist colleagues or clients Train new technicians or junior engineers Communicate clearly with other trades on construction sites 2. Application in Diagnostics and Troubleshooting In daily practice, these fundamental laws are my primary diagnostic tools: Ohm's Law: To quickly verify if a load is abnormal (resistance measurement, calculation of expected current) Kirchhoff's Current Law (KCL): To track current leaks or verify load distribution in an electrical panel Kirchhoff's Voltage Law (KVL): To analyze abnormal voltage drops on long lines or in complex circuits 3. Installation Design and Sizing In electrical installation or renovation projects: Precise calculation of cable cross-sections based on current ($I = P/U$) and allowable voltage drop Verification of protection coordination (circuit breakers, fuses) based on calculated fault currents Sizing of reactive power compensators by understanding relationships between voltage, current, and phase shift 4. Optimization and Energy Efficiency A thorough understanding of the relationships between voltage, current, and resistance helps identify sources of losses: Identifying defective or corroded connections that increase contact resistance Analyzing voltage drops in long lines to decide on a voltage increase or section enlargement Energy auditing: measuring currents to identify phase imbalances that cause additional losses 5. Electrical Safety At the heart of safety, these laws are essential for: Calculating potential short-circuit currents and verifying the adequacy of protection devices Understanding electrical risks (Joule's law: $P = R \times I^2$) to raise team awareness Analyzing incidents to identify root causes Conclusion These laws are not mere academic formulas, but living tools that I use daily, sometimes intuitively. Today's review reminds me of the importance of regularly returning to these fundamentals to refine my professional judgment, improve my diagnostics, and design safer, more efficient installations.

Q 5) Independent Research: AIU Live Classes are a starting point for further learning beyond the class. Search similar content either online or in the AIU online library and review it then share the name or link here. If its from AIU Library copy the Source or ISSN, [show me how?](#) (can be a video, academic publication, web site. lecture or book) (minimum 10 characters)

A 5) For further independent research beyond today's Live Class on electrical laws (Ohm's Law, Kirchhoff's Laws, and their real-world applications), I found an excellent academic resource through the NPTEL online learning platform (which offers courses from Indian Institutes of Technology). Recommended Resource: Course Title: "Fundamentals of Electrical Engineering" Instructor: Prof. Debapriya Das, IIT Kharagpur Source/Platform: NPTEL (National Programme on Technology Enhanced Learning) Course Code: noc25_ee160 Course Layout Highlights: Week 1: Basic Concepts and Basic Laws (covers Ohm's Law and Kirchhoff's Laws) Week 2: Methods of Analysis Week 3: DC Network Theorems Week 5-7: Sinusoidal Steady-State Analysis and AC Circuit Analysis Week 9: Three-Phase Circuits and Power Measurements Week 10-12: Single Phase Transformers, Three Phase Induction Machines, and DC Machines Reference Books cited in the course: "Fundamentals of Electric Circuits" C.K. Alexander and M.N.O. Sadiku (TATA McGraw-Hill) "Electrical Engineering: Principles and Applications" Allan R. Hambley (Pearson Education) "Engineering Circuit Analysis" W.H. Hayt and J.E. Kemmerly (McGraw-Hill) Why this resource is relevant: This course provides a rigorous academic treatment of exactly the topics we discussed today: Ohm's Law, Kirchhoff's Laws, and their applications in DC and AC circuit analysis. It extends beyond the basics into three-phase systems, transformers, and machines, which is valuable for advanced engineering work. How to access: The course is available for free enrollment at: https://onlinecourses.nptel.ac.in/noc25_ee160/preview For AIU Library access, I would recommend searching for the Alexander and Sadiku textbook mentioned above, which is a standard reference in electrical engineering education worldwide.