Introduction to Biomedical Instrumentation The Technology of Patient Care 2nd edition Christe Solutions Manual

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Chapter 2 Study Questions: Answers

1. Patients are susceptible to shock for many reasons, including the removal of the skin as an insulator – the skin is a natural insulator but may be damaged or open from wounds or connections to blood vessels. In addition, patients may be too weak or unaware of circumstances that might be dangerous so avoidance of danger can be challenging. In addition, medical care often involves many devices. The use of these devices significantly increases the risk of a negative event within the surrounding environment.

2. An example of macroshock would occur when a device has some type of fault, say a power cord which is damaged, and a person touches the power cord or the device and acts as a more viable electrical connection. The power source is the wall outlet. In the case of macroshock, one can assume the fuse in the device would limit the power drawn from the outlet to limit injury that may be sustained.

3. Since microshock is a result of very small currents, a likely scenario could be the generation of static electricity from clothing which is passed from a staff member to the catheter which is connected to the patient's heart. Patients with heart catheters have restrictions which try to limit the opportunity for stray, low level electricity.

3. When the heart is generating electricity in a non-uniform, non-patterned way, a large application of current can synchronize all the cells into regaining pattern and rhythm. This electrical application would disturb a heart which was generating electrical patterns in a normal way. However, it can be restorative if the heart is not functioning properly. If the heart cells no longer are alive or no longer are capable of generating electricity, no application of energy can restore its activity.
4. Human skin is generally an insulator. When wet or when hair has been removed, the amount of impedance is diminished. This insulation is very useful to minimize electrical shock except when information from inside the body would be beneficial to obtain – then the impedance can be a challenge

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