



BME-1156 Biomedical Engineering C ?
Exam 1 -- 21.10.2009 9:00-12:00

Please answer all questions in English. Please keep your handwriting/printing readable and drawings understandable. The exam is worth 100 points.

- 1) Action potentials (APs)
 - a. Describe and explain what an action potential is, including what happens immediately before and after it. (10 points)
 - b. Name two different sources/types of APs and draw them. (6 points)
- 2) Name 2 imaging modalities that better image *hard* tissues such as bones. Explain your reasoning. (10 points)
- 3) Name 2 imaging modalities that better image *soft* tissues such as the brain or stomach. Explain your reasoning. (10 points)
- 4) Design a device that stimulates the stomach to prevent obese (ultra-fat) people from overeating. Draw, label, and explain the different components of your device and explain how your design works. Remember to include your leads. (22 points)
- 5) Provide and explain one example of each type of rehabilitative technology. Also, explain what role each category of devices play.
 - a) Chronic/long term therapy (6 points)
 - b) Temporary/short term therapy (6 points)
 - c) Acute & transient (short term usage at an unknown time) (6 points)
- 6) Design a "vitality" package to be installed in new cars to detect as much information as possible regarding the passengers in the car after a car accident. Include in your design 3 types of sensors or equipment to help determine the victims' vital state to be automatically sent to emergency services. Multiple instances of the same sensor installed in every seat only counts as one type of sensor/equipment. Draw, label, and explain your "Vitality Package". (3 types x 8 points each = 24 points)