

1. (10 %) A physician in National Cheng Kung University Hospital suspects that the meter-type sphygmomanometer (indirect blood-pressure measurement device) might be inaccurate. As a biomedical engineeringer, please set up an experiment to calibrate the meter-type blood pressure measurement device.
2. (15 %) Describe the measurement principles for electrocardiogram (ECG). Plot the resting electrical axis based on the ECG, shown in Fig. 1.

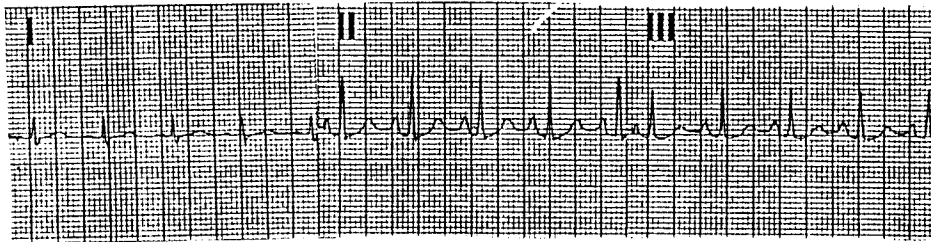


Fig. 1

3. (25 %) Bioimpedance is one of the non-invasive technique for measuring the physiological parameters. (a) Describe the underlying principle, and (b) draw the block diagram of your design of impedance pneumography.
4. (15 %) Describe the stages (phases) of a gait cycle.
5. (15 %) With aging, there are increases in both the periosteal and endosteal geometry of the long bone. Although this age-related remodeling results in only minor changes in cross-section area, it is associated with marked increases in bending stiffness. Why?
6. (20 %) Consider the target subjects, what are the major differences between biomedical engineering and traditional engineering?