Neither calculators nor materials are allowed.

1. About the recording systems:
   a) Explain what is the meaning and role of a stimulator in physiological recording system. Give an example of the use of the stimulator (what kind of stimulator and stimulating energy) to study the neural system (nerves or brain) of the body (what stimulated and what is the response).
   b) Explain what a piezoelectric transducer is and what kind of medical application it has.

2. About the ECG:
   a) Describe the standard 12-lead ECG system and explain how different leads do differ from each other.
   b) Figure shows three types of common noise components corrupting the ECG signal (a, b, and c). Name each of them, clarify how they are coupled with the ECG and explain how they can be best removed or eliminated.

3. Related to the medical imaging, explain
   a) production, meaning and importance of the main magnetic field \( B_0 \) in MRI system
   b) main differences between planar and tomographic (CT) x-ray imaging systems and images.

4.a) Explain basic principles of artificial cardiac pacemaker and main indications to use it.

   b) Draw a simplified system model of circulation of the human body and indicate the components of the model and system parameters.