1. (   ) When we measure the ECG with the six chest leads, the negative terminal (or the ground point) should be (A) RA+LA, (B) RL+LL, (C) RA+LA+LL, (D) RA+LA+RL+LL, (E) none of the above. (Note: LA = left arm, RA = right arm, LL = left leg, RL = right leg, and “+” means connecting the leads together through appropriate resistors.)

2. (   ) Refer to the figure below for questions 2 to 4. Which of the four ECG waveforms suggests the presence of bundle branch block? (A) A, (B) B, (C) C, (D) D, (E) none of the above.

3. (   ) Which of the four ECG waveforms suggests the possibility of atrial fibrillation? (A) A, (B) B, (C) C, (D) D, (E) none of the above.

4. (   ) The elevation of the S-T segment of the ECG indicated the possible presence of myocardial ischemia. Which of the four ECG waveforms shows the problem of S-T elevation? (A) A, (B) B, (C) C, (D) D, (E) none of the above.

5. (   ) Refer to the figure on the right for questions 5 and 6. The gain for the first stage, i.e. \( \frac{V_3 - V_4}{V_1 - V_2} \), is (A) 6, (B) 8, (C) 10, (D) 12, (E) none of the above.

6. (   ) The gain for the second stage, i.e. \( \frac{V_0}{V_3 - V_4} \), is (A) -6, (B) -8, (C) -10, (D) -12, (E) none of the above.

7. (   ) Which of the following statements regarding the oximetry and the pulse oximetry is incorrect? (A) The pulse oximeter exploits the pulsatile nature of arterial blood flow to allow for the in-vivo measurement of arterial oxygen saturation. (B) The oximeter measures the oxygen saturation of the blood sample in vitro. (C) The state-of-the-art pulse oximeters require a means of stopping the arterial blood flow momentarily to obtain a baseline calibration. (D) Whereas the idea of oximetry can be traced back over a century ago, the idea of pulse oximetry was patented relatively recently in 1975. (E) none of the above.

8. (   ) Which of the following assumptions regarding pulse oximetry is incorrect? (A) Pulsation in venous blood flow is negligible. (B) There exist only two types of hemoglobins in the arterial blood, i.e. oxyhemoglobin (HbO₂) and deoxyhemoglobin (Hb). (C) The effect of scattered light can be ignored. (D) The length of the optical path remains unchanged during systole and diastole. (E) none of the above.

9. (   ) The extinction coefficient is 0.1 for HbO₂ and 1.0 for Hb at 660 nm (\( \lambda_1 \)), and is 0.2 for both HbO₂ and Hb at 800 nm (\( \lambda_2 \)). The amplitude-baseline ratio (R) determined at these two wavelengths is 0.95, where \( R = \frac{A_1}{B_1} \div \frac{A_2}{B_2} \). The arterial blood saturation should be (A) 98%, (B) 95%, (C) 90%, (D) 85%, (E) all of the above.

10. (   ) The circuit on the right is a (A) low-pass filter with a cutoff frequency of 159 Hz, (B) high-pass filter with a cutoff frequency of 159 Hz, (C) low-pass filter with a cutoff frequency of 318 Hz, (D) high-pass filter with a cutoff frequency of 318 Hz, (E) none of the above.