

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

You are assigned to design a device and the required server system with the following functions:

- (a) The device itself is a wearable device, like a watch.
- (b) The user may use it to measure his/her ECG(心電圖). The device will automatically record the ECG and analyze the ECG pattern to determine whether there is any abnormality.
- (c) The device would upload the records to a remote server, so that the user can use the online data to evaluate his/her ECG history.

Answer the following questions:

- (1) (9%) Your boss thinks you shall design the device so that it uses WiFi as the only communication media. Do you agree? Why or why not?
- (2) (9%) If you wish to compress such data, shall you use lossless compression or lossy compression? Explain why.
- (3) (9%) For your device, assume that it is a miniature computer. What OS would you choose for this computer? Why?
- (4) (9%) After you implement the software, it is important to perform software testing. Name at least two strategies for software testing.
- (5) (9%) Explain what 'sampling' and 'quantization' mean for your device. (Such as, when do you need to perform these operations, what do they do, what kind of data do they generate.)
- (6) (9%) How do you determine which programming language to use for implementing the software of this wearable device? Name at least three factors to consider.
- (7) (9%) Do you think this device belongs to 'IoT technology'? Why or why not?
- (8) (9%) Your boss thinks you shall use 'cloud computing' to implement this system. Do you agree? Why or why not?
- (9) (9%) During the software implementation, would you choose arrays or linked lists to store the data? Explain why.
- (10) (9%) To store the ECG data, would you choose integer data types or floating point numbers to store them? Explain your reason.
- (11) (10%) How would technologies of artificial intelligence or machine learning help you develop this system?