

1. (20 %) Please briefly describe the following terms:
  - (a) Simple Mail Transfer Protocol (SMTP)
  - (b) Virtual Private Network (VPN in networking)
  - (c) spam (in e-mail system)
  - (d) Open DataBase Connectivity (ODBC in database)
  - (e) Domain Name System (DNS in network)
2. (10 %) Antivirus programming is a big business now. Can you differentiate common usages of macro virus, worm, and Trojan horse?
3. (10 %) What are the differences between software interrupt and hardware interrupt? Please give an example for each case.
4. (20%) Write a function with your favor computer language to find the remainder of  $a$  divided by  $b$  where  $a$  and  $b$  are two input positive integers.
5. (20%) Describe two algorithms to sort an integral array.
6. (20 %) Fig. 1 is a trace of electrocardiogram (ECG), a signal measured from heart beats.
  - (a) How to send this analogue signal to the computer for processing? Please describe your considerations in acquiring the ECG signal in digital form.
  - (b) If the ECG signal has been acquired in the computer, your next job is to determine the heart rate (beats/minute). You can describe your algorithm by using the pseudo codes or drawing a flowchart. Give your assumptions.

(Figure 1)

