Self-evaluation Exercise

1. (a) What are the six fundamental steps of direct digital control (DDC) design? Briefly describe each of them

(6 marks)

Identify the type of signals for the following points in a direct digital control (DDC) system by indicating DO (digital output), DI (digital input), AO (analogue output) and AI (analogue input).

1) Room temperature sensor

2) Filter alarm of air handling unit

3) ON/OFF command for a fan

4) Flow meter

5) Flow switch

6) Air flow modulation command

7) Fire alarm bell activation command

8) Differential pressure switch

9) Differential pressure sensor

10) ON/OFF status of a chilled water pump

(5 marks)

(b) Describe briefly the basic characteristics of the five types of control methods commonly used for building and HVAC control systems. Illustrate with simple diagrams or figures.

(10 marks)

(c) Flow measurement devices are important components of control and piping systems. Name the common types of flow meters and briefly describe their operation principles and typical applications.

(10 marks)

2. (a) Explain the basic concept of the Open System Interconnection (OSI) seven-layer reference model. Describe the commonly used topologies for building automation systems.

(13 marks)

(b) What is the meaning of "interoperability" for building automation and control systems? Describe the methods of local-area network (LAN) technologies used in the data link layer and physical layer of BACnet.

(12 marks)

[* *Solution outline will be put onto the course website three weeks after distribution of this.*]