PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Final Examination : Semester II | Academic Year : 2004

Date : 23 February 2005 | Time : 0900 – 11.00

Subject : 217-452 Real-time Software | Room : R200

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Attempt all questions.

1.

(a) Detail the differences between traditional real-time applications and a dataflow-based real-time applications. (5)

(b) Describes hardware and software requirements for a typical LabView Real-Time system. (5)

2. In a typical SCADA system, explain and show the control panel and the diagram in LabView for

(a) data acquisition via a serial port. (5)

(b) historical data logging using Access database. (5)

(c) trend displaying. (5)

(d) alarms and warnings. (5)

3. The underground tank monitoring system monitors two underground tanks by reading thermometers and levels of floats installed in each tank. To read a float and thermometer in one of the tanks, the PC must send, via serial ports, a command to the hardware to tell it which sensors in the tanks to read from. Since gasoline expands and contracts substantially with changes in temperature, the system must use both the temperature and the float level to calculate the number of gallons of gasoline in a tank.

The system must monitor the level in each tank periodically, and it must flag as leaking any tank in which the number of gallons drops slowly and consistently over a period of hours. The system must pay special attention to tank in which the level is rising rapidly and set off the alarm if such a tank gets

close to full and the level is still rising. Overflows can happen quickly when a tanker truck is refilling an underground tank.

*Question:* Design the software using LabView for the underground tank monitoring system. Show

(a) the system architecture. (2)

(b) the details of each control panels and diagrams. (8)

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