



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Control Engineering

Lecturer : Prof. Dr. Hamdy Ashour

Course : Industrial Automated Systems II

Course Code : EE 518

Marks : 40

Date : 02 / 6 / 2014

Time : 2 hour

Final Exam

Use clear diagrams and give examples as you can to answer ALL the following questions

(Q1) (8- Marks)

[A8, A20, B15]

Suggest PLC modules and connections then write down the software program to show how PLC can be used in a closed loop level control of an oil tank by sensing the level using single analog sensor and keep the level on the required reference level through:-

- (a) On-Off operation of a position controlled valve
- (b) Speed control of a single pump unit

(Q2) (9- Marks)

[A8, B7, C15]

Use diagrams and give industrial examples to discuss what is meant by:-

- (a) ASI protocols and gateway devices
- (b) Smart devices and systems
- (c) PC based data acquisition systems and functions of signal condition cards

(Q3) (12- Marks)

[A8, C16]

Give practical examples and illustrated diagrams to :-

- (a) Discuss the main five types of Siemens PLC family and how they can be connected together
- (b) Describe how Alarms, Trends, and Reports could be realized within the HMI-SCADA program
- (c) Illustrate how generator in power station could be operated with PC- based off-line assistance
- (d) Show how PLC and SCADA could be a part of DCS system

Members of course Examination Committee:		Signature:	Date:
Lecturer:	Prof. Dr. Hamdy Ashour	Hamdy	18/5/2014
Course Coordinator :	Dr. Ahmed El-Shenawi		18/5/2014
Head of Department:	Prof. Dr. Hamdy Ashour	Hamdy	18/5/2014

(Q4) (11- Marks)

[A8, A15, B3, B15, C2, C3]

It is required to monitor and control the operation of a proposed underground train system in Alexandria consists of 12 stations starts from *Aboukir* and ends in *Bourg-Elarab*. Each station could have 4 different systems with different sensor and actuator types as given in table1. Each of the 4 systems should be monitored in 3 different locations:

- 1) Local field with each system level
- 2) The station engineering and operating level
- 3) The Alexandria main central monitoring and management level

*Design and draw a complete DCS based system including industrial sensors, actuators, PLCs, HMIs, PCs, communication buses and possible SCADA pages navigation to implement such proposal.

TABLE 1

(1) Power Distribution System	(2) Ventilation and Conditioning System	(3) Escalators and Elevator System	(4) Light and Doors System
<i>Three Intelligent power sensors (P,V,I)</i>	<i>One Analog temperature sensor</i> <i>One Analog humidity sensor</i>	<i>Six Digital photo and limit switches</i>	<i>four Digital motion detectors</i>
<i>Four contactors for 2 ATS system</i>	<i>One Intelligent VSD</i> <i>One Intelligent Valve</i>	<i>Six contactors for motors F/R operation</i>	<i>Six contactors (2 for lights and 4 for doors)</i>

Good Luck

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