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26/05/19

University	Menoufia		Date	26/05/2019
Faculty	Electronic Engineering		Time	From 10 am to 1 pm
Department	Industrial Electronics and Control Engineering		No. of Pages	4
Academic Term	2 <sup>nd</sup> Term, 4 <sup>th</sup> Year		No. of Questions	3
Course Name	Industrial Control Syst.		Full Mark	70
Academic Year	2018/ 2019		Exam.	Final Exam.
			Examiner	Dr. Ramy Farid

Answer all the following Questions

Question 1

Draw a schematic diagram for typical SCADA system for the system with the following specifications.

1.1 The field sit contains

A. 3 Magnetic Flow-meters.	H. 10 programmable pressure switches.
B. 5 Flow switches	I. One temperature transmitter.
C. 20 Flow gauges (indicator)	J. 10 temperature gauges.
D. 5 Ultrasonic level transmitters.	K. 2 push-buttons for start/ stop
E. 2 Inductive Level switches, each one has 4 electrodes with different lengths	L. 10 AC three phase motors rotate in two directions (forward / Reverse)
F. 2 pressure transmitters.	M. 5 DC motors rotate forward only.
G. 16 pressure gauges	N. 20 butterfly valves operated manually.

1.2 It's recommended to use M304 PLC as RTU.

1.3 Each RTU is constructed from:

- A. Rack M340 - 8 slots – BMX XBP 0800
- B. Power supply module M340 - 100...240 V AC - 20 W – BMX CPS 2000
- C. Processor module M340 - max 1024 discrete + 256 analog I/O – BMX P34 2020
- D. Discrete input module M340 - 24 V DC positive – BMX DDI 1602
- E. Discrete output module M340 - solid state - 24 V DC positive- BMX DDO 1602
- F. Analog input module M340 - high speed – BMX AMI 0410.
- G. Flash memory card 8 Mb - BMX RMS 008MP.

1.4 25% spares for all inputs & outputs must be considered in each RTU.

1.5 Now you must determine the number of RTUs with full capacity required to cover all system requirements.

1.6 First three RTUs are connected together as the LAN topology is designed with each node connected directly to a central network hub, or switch before continuing to its destination, the hub, or switch manages and controls all functions of the network.

1.7 Second three RTUs are connected together as the LAN topology consists of main run of cable with terminator at each end, all nodes are connected to this cable.

