COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical & Computer Control Engineering

Lecturer : Dr. Mostafa Abdel-Geliel

Course : Automated Industrial System I

Course Code: EE 512 **Time : 2 hours**

Date :13 / 1 /2016 **Marks: 40**

Final Exam

(Q1) (10 marks)[A8,A28,B4,C14]

(a) Explain with drawing the types of digital input/output modules and their connection diagram.

(b) Explain the main components of PLC and its operation.

(c) Discuss the type of timers and its implementation in Siemens PLC.

(Q2) (14 marks)[A2,A20, A31,B2,B7,B8]

(a) Convert the hardwire control circuit, shown in Fig.1, into the corresponding logic circuit and ladder. What is the modification in order to achieve the same task using PLC then write its program in statement list?

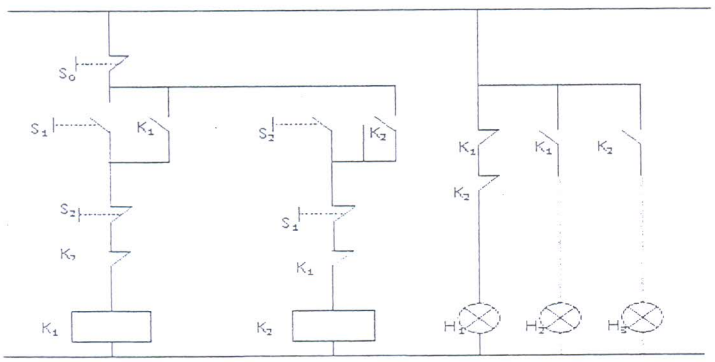

Fig. 1

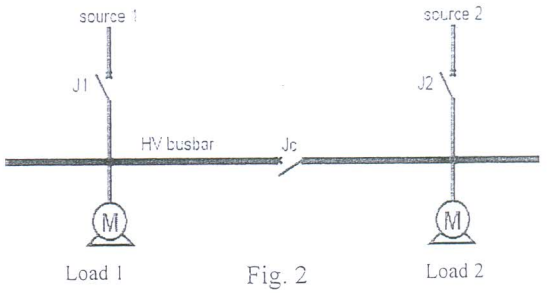

Fig. 2

(b) Design the control circuit, using hardwire and PLC, of a substation that has the single line diagram shown in Fig. 2. The system operates as two different sources with two different loads in normal situation. While it work as automatic transfer switch if one of the two feeders does not serve. The operation is summarized in the following table

Source 1	Source 2	J_1	J_2	Jc
ok	ok	on	on	off
ok	non	on	off	on
non	ok	off	on	on
non	non	off	off	off

Note that the transition from one state to another should be granted by making a time of delay 3 s. Where J1, J2, and Jc are circuit breakers of source 1, source 2 and bus-coupler

(Q3) (6 marks)[B2,C3,B9]

A motor is operated in two mode according to the timing diagram shown in Fig.3 after start; where t_1=5sec, t_2=3sec, t_3=5sec and t_4=2sec.

Write a plc program in LAD and Sequential Flow Chart (SFC) to operate the motor. Assign the required input and output

Members of course Examination Committee:	Signature:	Date:
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Course Coordinator : Dr. Ahmed Elshenawy		/1/2016
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