
BITS, PILANI – DUBAI, ACADEMIC CITY, DUBAI
FIRST SEMESTER 2012 – 2013
EEE C417 COMPUTER BASED CONTROL SYSTEMS
COMPRE (CLOSED BOOK)

MAXIMUM MARKS: 80
DATE: 06/01/12

WEIGHTAGE: 40%
DURATION: 180 MINUTES

1. (i) Explain the working of piezo electric pressure transducers with neat sketch. **[5marks]**
(ii) Draw the diagram of fiber optic photo elastic sensor. **[2 marks]**

2. Draw and explain the velocity algorithm flow chart and derive the relationship between position and velocity algorithm. **[7marks]**

3. (i) Explain the design of control and Baily micro Z system with neat sketch. **[5marks]**
(ii) Draw the behavior of different feedback control actions for P, PI and PID. **[2 marks]**

4. (i) Briefly explain the working of single seated sliding stem valves with neat sketch. **[5marks]**
(ii) Draw the working of single acting pneumatic cylinder with neat sketch. **[2marks]**

5. (i) List the types of model based adaptive intelligent controller and explain the working principle with neat sketch. **[5marks]**
(ii) List the types of embedded control systems with suitable example. **[2 marks]**

6. (i) Explain the design of expert controller architecture with neat sketch. **[5marks]**
(ii) List the types of basic processor architecture and compare them with neat sketch. **[2 marks]**

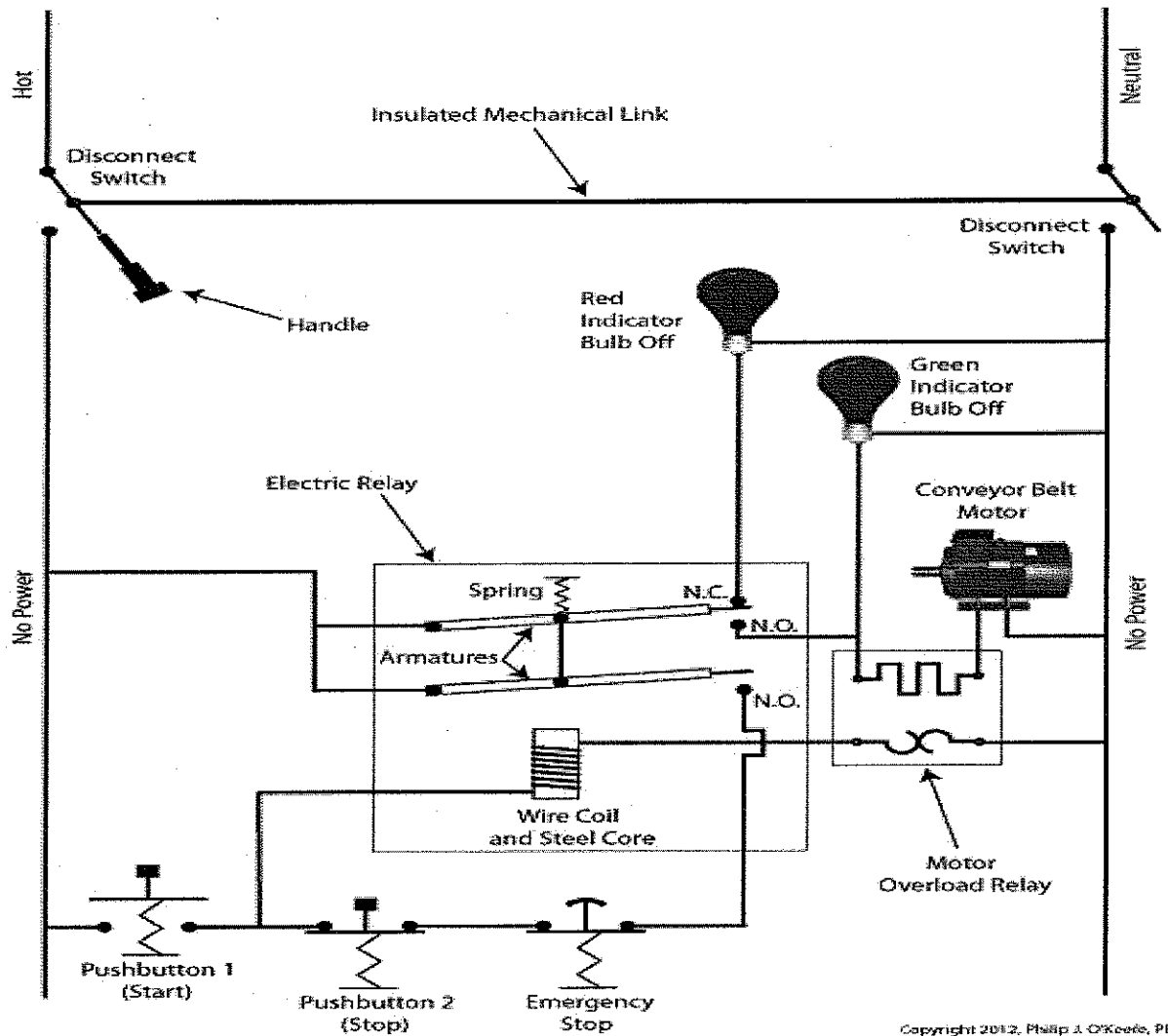
7. Explain the modeling aspects of kiln automation system in a cement plant. **[7marks]**

8. Using C programming, Design a micro controller which will convert parallel input into serial output. **[5 marks]**

PTO

9.(i) Explain the various levels of distributed control system based on AEG-Telefunken Log stat. **[3marks]**

(ii) Draw the complete ladder diagram for the motor control system given in Figure 1. **[4 marks]**



10. Explain SCADA architecture with neat sketch. **[5marks]**

11. (i) With diagram explain the control token operation in data communications between multi processor systems. **[5marks]**

(ii) Explain the working of potentiometric biosensors **[2marks]**

12. (i) Explain two different display methods and scanning in CRT display. **[3 marks]**

(ii) Explain the working of feedback and feed forward control system through simple water heating control system. **[4 marks]**

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TEST 2 (OPEN BOOK)

MAXIMUM MARKS: 20
DATE: 27/11/12

WEIGHTAGE: 20%
DURATION: 50 MINUTES

1. Design a micro controller for generating square wave for every TON – 40 m sec seconds & TOFF for 35 m seconds using C program. Use Timer 1 to generate the square wave form and receive the output at port P2.3. **[5marks]**
- (b) Explain, how position algorithm and velocity algorithm responds to shut down or failure condition. **[2marks]**
2. (a) Consider an alarm system has 4 (danger) inputs to protect the factory, so that in case of any danger signals any of these inputs, it will give a certain alarm. Using programmable logic controllers, write a program according to the following requirements:
- (i) If only one of the inputs (sensors) is turned on, nothing will happen.
 - (ii) If two of the inputs are turned on, the Red Pilot Light will be activated.
 - (iii) If three of the inputs is turned on at same time, it would trigger an Alarm (SIREN)
 - (iv) If all the four inputs are ON together, it would trigger an alarm to the Fire Department. Which indicates that all of the four signals together mean fire will erupt.
- (A) Determine the inputs and outputs of the system.
(B) Write a PLC program using ladder logic to accomplish that. **[6 marks]**
- (b) Draw the ladder logic diagram for the given boolean expression. **[2 marks]**
- $$A = \bar{B}.C (\bar{D} + E + \bar{F})$$
3. (a) Draw the ladder diagram for the XOR gate connected with lighting load. Use Input switches as A & B (NO or NC). **[3marks]**
- (b) Write down the steps involved in code fusion procedure of a micro controller. **[2 marks]**

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TEST 1(CLOSED BOOK)

MAXIMUM MARKS: 25
DATE: 09/10/12

WEIGHTAGE: 25%
DURATION: 50 MINUTES

1. Explain about pyrometers and working of automatic optical pyrometers with neat sketch. **[5 marks]**

2. (i) Explain the working of Fibre optic pressure transducers with neat sketch and its response graph. **[3 marks]**
(ii) Draw liquid level sensor which measures level of conductive liquid. **[2 marks]**

3. (i) Explain the working principle of Resistance Temperature Detectors with neat sketch. **[3 marks]**
(ii) Draw the diagram of Fibre optic linear accelerometer **[2 marks]**

4. (i) Explain Piezoelectric Bio Sensor. **[2 marks]**
(ii) Explain cascade control with neat sketch. **[3 marks]**

5. (i) Explain the about backward chaining expert system. **[3 marks]**
(ii) Draw the total plant hierarchical control system with various levels. **[2marks]**

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Quiz 2 (CLOSED BOOK)

MAXIMUM MARKS: 14
DATE: 18/12/12

WEIGHTAGE: 7%
DURATION: 20 MINUTES

1. Define Contrast ratio in CRT display [1 mark]

2. Name two types of scanning used in CRT applications. [2 mark]

3. Compressed oil is used for _____ control.
[1 mark]

4. Define MTBF & MTTR [2 marks]

5. Name the DCS system used for frequent data communications. [1 mark]

6. Define HTD in Honey well TDC 200 system architecture

[1 mark]

7. List at least four qualitative parameters of display systems in control systems.
[2 marks]

8. _____ cylinder is capable of performing operating motion in both possible directions. [1 mark]

9. List the various video screen selections through keyboard in Leeds & Northrup DCS system. [1 mark]

10. Draw the diagram of Reed Relay and explain the working of it. [2marks]

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Quiz 1 (CLOSED BOOK)

MAXIMUM MARKS: 16
DATE: 23/10/12

WEIGHTAGE: 8%
DURATION: 20 MINUTES

1. Name the sensor which uses seebeck's principle of operation. [1 mark]

2. Draw the diagram for absorptive optical sensor. [1 mark]

3. Explain in short about bit slice processors [1 mark]

4. List the advantages of Intel i860 processor over other processors [2 marks]

5. Name the sensor using surface Acoustic wave for sensing. [1 mark]

6. Draw the behavioral graph for P,PI & PID control action. [2 mark]

7. The simplest and cheapest form of automatic control is ----- used in process control. [1 mark]

8. Name the type of the control used in steam flow versus air flow in boiler. [1 mark]

9. Define DMA in micro processors. [1 mark]

10. _____ of the process is its ability to store energy or material. [1 mark]

11. Draw the diagram of the LVDT transducer with sample response graph [2 marks]

12. To avoid skewing of bits ----- data transfer preferred in micro processors. [1mark]

13. Which controller action is called automatic reset? [1 mark]