BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH   SEMESTER : III
BRANCH: ECE   SESSION : MO/19

SUBJECT: EC609 INDUSTRIAL INSTRUMENTATION
TIME: 3 HOURS   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Define the types of diagram used in Industrial Instrumentation. Also explain about the standards used in Industrial Instrumentation. [5]

Q.1(b) Build the piping hook-up diagram of a flow element to flow transmitter in a fluid flow service. Also mention the testing process of a control loop. [5]

Q.2(a) What is PID controller? Explain the technique used in a controller tuning and calculate the nominal three-mode controller settings for a process begins oscillation with a 30% proportional band in an 11.5 minute period by applying Ziegler-Nichols method. [5]

Q.2(b) Differentiate between feed-forward control and ratio control. Discuss selective control with suitable application. [5]

Q.3(a) What do you understand with sequential control? Explain Relay ladder Logic and symbols used in constructing Relay ladder logic. Construct an automatic control panel for running of an AC motor. [5]

Q.3(b) Draw and explain architecture of PLC hardware and software structure. Design and draw PLC ladder logic diagram for the problem shown in figure below. [5]
The sequence of the furnace is
   1. The heater will be ON when the ON-switch is activated, the door is closed, and the temperature is below the limit.
   2. The fans will be turned ON when the heater is ON or when the temperature is above the Limit and the doors is closed.
   3. The light will be turned ON if the light switch is ON or whenever the door is opened.
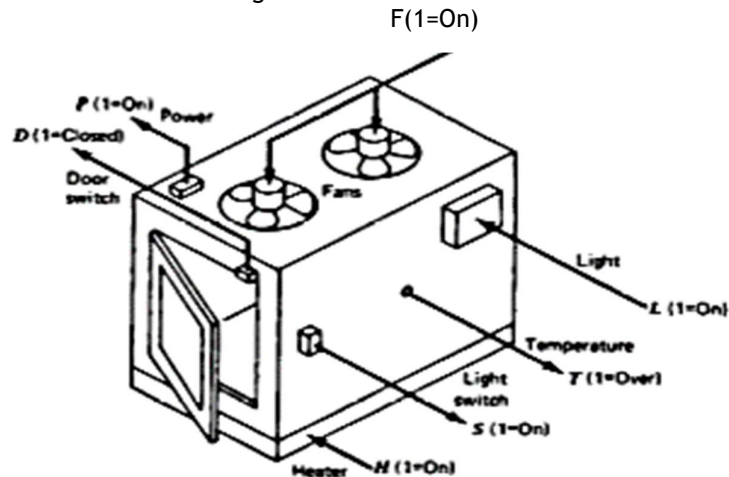
Q.4(a) Describe the actuator and classification of final control elements. Also describe the types of motor. [5]
Q.4(b) What are drives? Discuss the different types of drives and explain working of servo drives in detail. [5]

Q.5(a) Explain automation studio with its feature. Draw a PLC circuit for the implementation of the following expression using automation studio: [5]
Y1=(A'B+AB') + C'; Y2=A'C+Y1; Y3=AB+CD+A'BD'; Y= Y2.Y3

Q.5(b) Explain the designing steps in networking of sensors and actuators using field bus. What are the communication protocols used in automation system architecture? [5]

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