CLASS: BTECH   SEMESTER : VI
BRANCH: ECE   SESSION : SP/2023
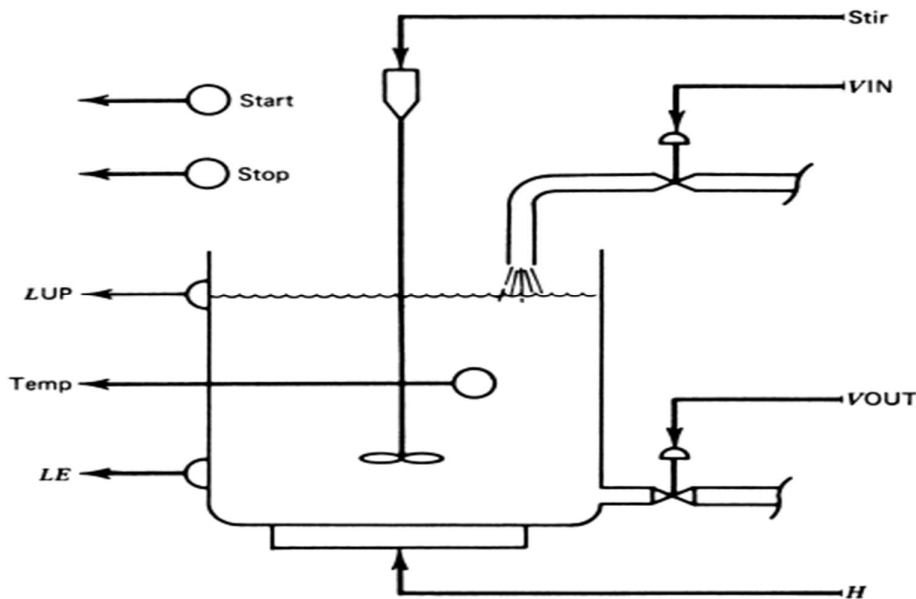
SUBJECT: EC357N INTRODUCTION TO INDUSTRIAL INSTRUMENTATION
TIME: 3 Hours   FULL MARKS: 50

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.

			CO	BL
Q.1(a)	What are various types of biosensors? Discuss their application areas.	[5]	CO1	2
Q.1(b)	Explain the working of scintillation counter for sensing X -ray and nuclear radiation.	[5]	CO1	2

Q.2(a) Sketch data logger block diagram and explain its working?   [5] CO2 2,3
A computer sequentially sampling 100 process parameters. It executes 14 instructions at 5.3µs /instruction for the computer to address and process one line of data. The multiplexer switching time is 5.3µs, and the ADC conversion time is 34µs. Calculate the maximum sampling rate for a line.

Q.2(b) Temperature is to be measured in the range of 250° C to 450°C with an accuracy [5] CO2 5
of+/-2°C. The sensor is a resistance that varies linearly from 280 Ohms to 1060 Ohms for this temperature range. Power dissipated in the sensor must be kept below 5 mW. Develop analog signal conditioning that provides a voltage varying linearly from -5 to +5 V for this temperature range.

Q.3(a) Sketch the block diagram of a DDC system and explain its working.   [5] CO3 2,3
Q.3(b) Discuss the controller drift and integral overshoot problem in PI control scheme of [5] CO3 2
velocity algorithm for DDC.

Q.4(a) Discuss the architecture of PLC and its advantages ovel relay logic control panels. [5] CO4 2
Q.4(b) Develop the ladder diagram for the control problem shown in Figure below.   [5] CO4 5

The event sequence is ,1. Fill the tank. 2. Heat and stir the liquid for 30 min. 3. Empty the tank. 4. Repeat from step 1. Assume START push button is NO the STOP is NC while NO and NC are available for the limit switches.

Q.5(a) Compare intelligent controllers and conventional PID controllers. Sketch the block diagram of Predictive control approach for controlling a process and explain its working. [5] CO5 3,4

Q.5(b) Discuss the architecture of fuzzy logic controller. [5] CO5 2

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