

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

**CLASS: BTECH**  
**BRANCH: ECE**

**SEMESTER :VI**  
**SESSION:SP/2024**

**SUBJECT: EC357 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 handbook/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Distinguish between sensor and transducer with examples. Explain briefly about the measurand characteristics, static characteristics, and environmental characteristics of transducers.	[5]	1	2
Q.1(b)	Define the terms- electrode potential and cell potential. Explain standard hydrogen electrode. Outline its utility in instrumental analysis.	[5]	1	2,3
Q.2(a)	Describe analog to digital converter (A/D) and digital to analog (D/A) converter in brief. Explain final control element in the process control loop with diagram.	[5]	2	2
Q.2 b)	Discuss data logger and its characteristics. Explain in brief basic parts of a data logger.	[5]	2	1
Q.3(a)	Describe computer supervisory control. Draw the block diagram of SCADA and explain different components used in it. Where is it used?	[5]	3	2,3
Q.3(b)	Elaborate continuous controller modes. Explain PID control. Find the percentage error in measurement if the variable range is 4-20 mA and the measured value is 7 mA with a set point of 10 mA.	[5]	3	2,5
Q.4(a)	Discuss the main components of PLC structure. Explain PLC scan cycle.	[5]	4	2
Q.4(b)	Describe ladder logic in PLC programming. Explain ladder diagram components. Using PLC ladder diagram realize AND, OR, and AND-OR operations.	[5]	4	2,6
Q.5(a)	Define adaptive control and Index Performance. Explain model reference adaptive control with the help of block diagram.	[5]	5	2
Q.5(b)	Explain expert controller using block diagram. Write down the objectives of an ideal expert controller.	[5]	5	2

:::26/04/2024 M:::