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

CLASS: BE **SEMESTER: VI/ADD**
BRANCH: ECE **SESSION: SP/2020**

SUBJECT: EC6201 INTELLIGENT INSTRUMENTATION

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.
6. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q1 (a) Describe the features of an intelligent sensor. [2]
(b) What are bio-sensors? Discuss various types of bio-sensors. [3]

Q2 (a) How fluid flow through pipes or channels are measured in process industry? Explain by giving suitable examples. [2]
(b) Describe the conveyor flow concept for solid flow measurement with diagram. [3]
A grain conveyor system finds the weight on a 1.0-m platform to be 258 N. What conveyor speed is needed to get a flow of 5200 kg/h?

Q3 (a) How is optical fiber used for stress sensing? Describe a micro bend sensor and discuss its operation. [2]
(b) What are the advantages of non-contact type sensing? Explain by giving suitable examples. [3]

Q4 (a) What are the commonly known ionizing radiations and what are the detectors used for their measurement? [2]
(b) With neat diagram discuss the working of Scintillation counter. [3]

Q5 (a) What is the need of a signal conditioner in a DAS? [2]
(b) What is data logger? With suitable block diagram explain a microprocessor based 8 channel data logging system. [3]

Q6 (a) A humidity sensor resistance varies linearly from 250K to 120 K as humidity varies from 0 % to 100%. Power dissipation in the sensor must be kept below 100microwatt. Design analog signal conditioning to provide a voltage 0 to 1V as humidity varies from 0 % to 100%. [2]
(b) If humidity sensor resistance of the question 6(a), also varies linearly from 250K to 260 K as temperature varies from 0^{o}C to 60^{o}C with temperature then summarize the steps required to make the humidity sensor temperature independent. [3]

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