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Total number of printed pages – 2

B. Tech
FEEE 6301 (New)

Sixth Semester (Back) Examination – 2013
INDUSTRIAL PROCESS CONTROL AND DYNAMICS

BRANCH : EEE, ELECTRICAL

QUESTION CODE : B269

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
- (a) What are the objectives of Signal Conditioning Circuit?
 - (b) Write basic principle of Zero-Adjustment in Signal Conditioning Circuit.
 - (c) Draw circuit diagram of an Integrator for Analog Signal Conditioning.
 - (d) Write functions of Encoder.
 - (e) Write the significance of Boltzmann's constant.
 - (f) Write the relationship between Volume of Flow Rate and Drop in Pressure in Restriction type Flow meters.
 - (g) What is Pyrometry ?
 - (h) What is a Reaction Curve in Process Control ?
 - (i) What is meant by Tuning a Controller ?
 - (j) Write few advantages of using Electronics Controllers compared to Pneumatic Controllers.
2. (a) Draw circuit diagram of Low-Pass and High-Pass RC Filters and derive the Transfer Functions. 5
- (b) Draw circuit diagram and explain application of Opamp in Signal Conditioning Circuits in Instrumentation. 5

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3. (a) A sensor provides temperature data as $360 \mu\text{V}/^\circ\text{C}$. Develop comparator circuit that goes High when the temperature reaches 530°C . 5
- (b) Explain a method of converting an analog signal into digital signal. 5
4. (a) State the laws of Thermocouple. Describe signal conditioning and reference junction temperature compensation of Thermocouple. 5
- (b) With suitable diagram describe method of measurement of strain using strain gauge. 5
5. (a) Briefly describe Laser principle and its applications. 5
- (b) Briefly explain characteristics and operations of different types of Valves used in Actuator in process control instrumentation. 5
6. (a) With a suitable example, describe the working of a Self-Regulated process. Why is it called Self-Regulated ? 5
- (b) Describe characteristics of Proportional and Integral Control. 5
7. (a) Describe the following control configurations : (i) Cascade Control, (ii) Ratio Control. 5
- (b) With suitable diagram explain working of a Selective Control System. How is it different from Adaptive Control ? 5
8. Answer any **two** of the following : 5×2
- (a) Current-to-Voltage Converter – Circuit Diagram and Operation.
- (b) Construction and operation of Stepping Motor.
- (c) Distinguish between Feedforward and Feedback control configuration.

