Code :R7320204

1

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
INSTRUMENTATION
(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

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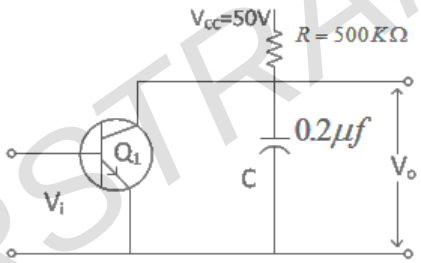
1. (a) Explain about different elements of measuring system with an example.
   (b) A pressure indicator showed a reading as 42 bar on a scale range of 0-50 bar. If the true value was 41.4 bar, determine:
      i. static error
      ii. static correction
      iii. relative static error.
2. Describe the process of modulation and techniques usually adopted.
3. (a) With neat sketch explain the structure of cathode ray tube.
   (b) A Trigger pulse is applied to the sweep generator shown in the figure (i) for every 10ms. Compute the amplitude of the voltage V_0 across the capacitor when the trigger pulse is applied.



4. With the neat sketch explain Dual slope integrating type DVM.
5. With the block diagram explain heterodyne wave Analyzer and give its applications.
6. (a) Explain in detail about the classification of transducers
   (b) Discuss transfer and output characteristics of transducers.
7. (a) What is meant by Gauge sensitivity ? obtain the expression of Gauge sensitivity and output voltage.
   (b) A strain gauge having a resistance 100Ω and gauge factor of 2 is connected in series with a ballast resistance of 100Ω across a 12v supply. Calculate the difference between the output voltage with no stress applied and a stress of 140 MN/M^2. The modulus of elasticity is 200 GN/M^2.
8. Explain the theory of radiation pyrometers. Describe the different radiation receiving elements.

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Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
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1. (a) Explain the terms: (i) Drift (ii) Accuracy (iii) Linearity (iv) Hysteresis.
   (b) A pressure measuring system consists of a piezoelectric transducer, a charge amplifier and ultra-violet charge recorder. Their sensitivities are 6.8 pc/bar, 0.0032 v/pc and 16mm/v respectively determine the deflection on the chart for a pressure change of 20 bar.
2. Explain how Angle modulation of a signal is done. Distinguish between Angle and phase modulation.
3. Derive the expression for electrostatic deflection of an electron beam in a CRT and obtain the Expression for deflection sensitivity.
4. With the block diagram explain microprocessor based Ramp type DVM.
5. Explain the term total harmonic distortion, Describe the functioning of a total harmonic distortion Meter.
6. (a) Explain the principal of operation of strain gauge and derive the expression for Gauge factor.
   (b) What are the advantages and disadvantages of resistance potentiometer.
7. Explain how angular velocity can be measured by using various types of tachometers in detail.
8. Explain how flow measurement can be done by using:
   (a) Hot wire anemometer
   (b) Ultrasonic flow transducer.

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Code :R7320204 **3**

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(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
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1. (a) Explain about the different dynamic Characteristics of a measurement system.
   (b) A thermometer initially at a temperature of 15^0c is suddenly plunged into a liquid bath maintained at 140^0c. After a time interval of 4 seconds, the thermometer indicated a reading of 75^0 Determine:
      i. The time constant for the thermometer.
      ii. The indicated temperature after five times constant.
2. (a) Explain the common forms of periodic signals with their waveforms.
   (b) What is complex form representation of periodic signals.
3. How phase and frequency can be measured with the use of a CRO, Explain.
4. Explain with a diagram, the basic principle of a successive approximation type DVM.
5. Explain:
   (a) Basic spectrum Analyzer
   (b) Spectral displays
6. (a) Explain the different principles of working of capacitive transducers.
   (b) A thermistor has a resistance of 3980Ω at the ice point (0^0) and 794Ω at 50^0c. the resistance temperature relationship is given by R_T =a.R_0 .exp(b/T). Calculate, the constants 'a' and 'b'.
7. Explain in detail how torque can be measured using various methods.
8. Explain how liquid level can be measured by using:
   (a) Gamma Rays
   (b) Ultrasonic method
   (c) Capacitive method

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III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
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(Electrical & Electronics Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
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1. (a) Explain in detail about different types of errors of measurement system.
   (b) Explain the terms:
      i. Sensitivity
      ii. Dead Zone
      iii. Threshold.
2. (a) Define all the standard test signals with suitable waveforms
   (b) Compare periodic and aperiodic signals.
3. Explain:
   (a) Sampling oscilloscopes
   (b) CRO probes
4. (a) Explain the operating principle of ramp type DVM.
   (b) State the advantages of a dual slope DVM over a ramp type DVM.
5. (a) Describe the circuit and working of a Q-meter, describe any two applications of Q-meter.
   (b) A circuit consisting of a coil, a resistor and a variable capacitor connected in series is tuned to resonance using a Q-meter. If the frequency is 500 KHZ, The Resistance 0.5Ω and the variable capacitor set to 350pf. Calculate the effective inductance and resistance of the coil, if the Q-meter indicates 90.
6. (a) Explain the construction, principle of working of LVDT and list the various advantages of LVDT.
   (b) Explain the principle of working of photovoltaic cell and explain why it is useful for space applications.
7. (a) Explain :
      i. moving coil type velocity transducer
      ii. moving magnet type velocity transducer.
   (b) What are the advantages and disadvantages of photoelectric tachometer.
8. (a) Explain how pressure can be measured by using :
      i. Inductive transducers
      ii. Capacitive transducers
   (b) Explain the construction and operation of pirani Gauge used for the low pressure measurement.

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