Code No: **R41026**

R10

Set No. 1

IV B.Tech I Semester Regular/Supplementary Examinations, Nov/Dec - 2015
INSTRUMENTATION
(Open Elective)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) What properties should a measuring system possess? Explain. [8]

  b) What is meant by a random error? Explain with an example. [7]

2 a) Discuss in detail about pulse code modulation. [8]

  b) What is meant by a modulated signal? Explain with an example. [7]

3 a) Discuss about the role of passive transducers in the measuring system. [8]

  b) Explain about the selection criterion in the selection of a transducer. [7]

4 a) Discuss the role of micro processor in the digital volt meters. [8]

  b) What is meant by a ramp type digital volt meter? Explain. [7]

5 a) Draw and explain about the characteristics that shows the deflection of electrons in a cathode ray tube. [8]

  b) Write short notes on sampling oscilloscope. [7]

6 a) What is meant by total harmonic distortion? Explain with necessary expressions. [8]

  b) Discuss briefly about the RMS voltmeters. [7]

7 a) Draw and explain about the plot of fractional resistance change (vs) fractional strain characteristics for different materials. [8]

  b) A strain gauge having Gf=2.0 and R=125 ohms is used to measure strains generated by the pressures of 50psi and 50,000psi in aluminum. The corresponding strains are 5 and 5000 micro strains. Calculate the percent changes of resistance of the strain gauge. [7]

8 a) Discuss in detail about the filled system thermo meter. [8]

  b) Explain in detail about head type flow meter with neat diagram. [7]

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1 a) Explain how a measuring system should exist.   [8]

   b) Discuss about the statistical analysis of random errors.   [7]

2 a) Explain how a signal will be represented as an aperiodic signal.   [8]

   b) What is meant by a sampled data? Explain with an example.   [7]

3 a) Write differences between a sensor and a transducer.   [8]

   b) Explain in detail about a piezo electric transducer.   [7]

4 a) Discuss the differences between analog and digital voltmeters.   [8]

   b) Explain the process of successive approximation in the digital voltmeters.   [7]

5 a) Explain how a graphic display is done by a cathode ray tube.   [8]

   b) The vertical deflection plates of a CRT are 5cm long and are situated 1.1cm
       apart. A deflecting voltage of 50V is applied between them. The screen is
       20cm away from the plates and the accelerating voltage is 1KV. Then calculate
       i) The transverse acceleration of electrons moving between the plates.
       ii) The deflection of spot on the screen from its centre.   [7]

6 a) Explain in detail about harmonic analysis with relevant expressions.   [8]

   b) Write the applications of spectral displays.   [7]

7 a) Explain any two transducers used in the measurement of displacement.   [8]

   b) Explain any one method of measurement of angular velocity with necessary
       expressions.   [7]

8 a) Explain about the platinum resistance thermometers.   [8]

   b) Discuss the role of float in the level measurement.   [7]

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1	a)	What are different desirable characteristics of a signal?	[8]
	b)	Write short notes on systematic errors.	[7]
2	a)	Explain briefly about the types of signal representations.	[8]
	b)	Discuss in detail about the pulse code modulation.	[7]
3	a)	Explain about the active transducers with relevant applications.	[8]
	b)	Write short notes on photo diodes.	[7]
4	a)	Discuss how the successive approximation is done in digital voltmeters.	[8]
	b)	Draw and explain about the digital pulse angle meter.	[7]
5	a)	Discuss how an electron is moved in a cathode ray tube.	[8]
	b)	What is the minimum distance that will allow full deflection of 5cm at the CRT screen with a deflection factor of 100V/cm and with an acceleration potential of 2050V?	[7]
6	a)	Explain about the frequency selective analyzers with example.	[8]
	b)	Discuss about the basic spectrum analyzers.	[7]
7	a)	Explain the operation of piezo electric accelerometer.	[8]
	b)	The resistance of a strain gauge is 120ohm and its gauge factor is 2. It is connected to a current sensitive Wheatstone bridge in which all the resistances are 125 ohms. If the input voltage is 4V and the resistance of the galvanometer is 100 ohm, calculate the detector current in micro ampere for 1 micro strain. Also calculate the voltage output if 1 micro strain is applied to the gauge and the voltmeter has infinite input impedance.	[7]
8	a)	Discuss the role of mechanical level indicators in the level measurement.	[8]
	b)	Explain in detail about the optical level indicators.	[7]

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1 a) Write brief explanation about the error in the measurement system.   [8]

   b) Explain about the dynamic characteristics of a signal.   [7]

2 a) Write the various applications of sampled data.   [8]

   b) Discuss the difference between the pulse modulation and pulse code
       modulation.   [7]

3 a) Explain about the passive transducers with relevant applications.   [8]

   b) What are various applications of LVDTs?   [7]

4 a) Explain about the digital frequency meter with neat diagram.   [8]

   b) Write the advantages and disadvantages of digital voltmeters.   [7]

5 a) Explain in teal about the transient recorder.   [8]

   b) Discuss about digital type data loger.   [7]

6 a) Explain about the functional operation of 'Q' meter.   [8]

   b) What is meant by a peak reading voltmeter? Explain.   [7]

7 a) The seismic mass of a spring mass accelerometer is 60g and the spring constant
       is 5000N/m. The amplitude of the relative displacement is ±2cm. Calculate the
       maximum measurable acceleration in g and the natural frequency of oscillation
       of the system.   [8]
   b) What are the various considerations to be made in the strain measurement?   [7]

8 a) Explain in detail about the diaphragm level indicator with neat sketch.   [8]

   b) Design a rotameter taper for flow of water up to 40 litres/min with float volume
       = 8 cm^3, the float diameter is 2cm, tube length is 28cm and the tube inlet
       diameter is 2cm. Assume the flow coefficient is 1 and the float is compensated
       for fluid density.   [7]

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