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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; Dec - 2016/Jan - 2017

Electronic Instrumentations

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a.	List the static characteristics of an instrument.	8
b.	The expected value of the current through a resistor is 35 mA. The measurement yields a current value of 30 mA. Calculate; i) Absolute error ii) % error iii) Relative error iv) % accuracy.	4
c.	Explain the principle of Dual slope integrating type digital voltmeter with a block diagram.	8
2 a.	What are Systematic errors? Explain the different types of it and also describe how these errors can be minimized?	10
b.	Calculate the value of the multiplier resistance on the 25 V range of a DC voltmeter that uses a 300 μA meter movement with an internal resistance of 200 Ω.	2
c.	Describe the principle of ramp type digital voltmeter with block diagram.	8

UNIT - II

3 a.	Draw the circuit diagram and obtain balance conditions for Hay's bridge circuit.	8
b.	A Wien bridge circuit consist of the following R_1 = 4.7 kΩ, C_1 = 5 nf, R_2 = 20 kΩ, C_3 = 10 nf, R_3 = 10 kΩ, R_4 = 100 kΩ. Determine the frequency of the circuit.	2
c.	List out any two applications and limitations of Whetstone's bridge.	4
d.	With necessary diagram, explain the working principle of Wagner ground connection.	6
4 a.	Explain with a diagram how Schering's bridge can be used to measure unknown capacitance?	8
b.	What are the precautions to be taken when using a bridge?	3
c.	An inductance comparison bridge is used to measure inductive impedance at a frequency of 5 kHz. The bridge constants at balance are L_3 = 20 mH, R_1 = 20 kΩ, R_2 = 50 kΩ, R_3 = 100 kΩ. Find the equivalent series circuit of the unknown impedance.	3
d.	Explain with a block diagram Inductance comparison bridge.	6

UNIT - III

5 a.	Explain the basic principle, advantages and limitations of a thermistor.	10
b.	Explain the operation of photo transistor with a neat diagram.	5
c.	Mention any five advantages of LVDT.	5

Contd.....2

6	a.	Explain the basic principle and advantages of differential output transducers with a neat block diagram.	10
	b.	Explain the operation of a piezoelectric transducer with a block diagram.	6
	c.	Mention any four advantages of potentiometers.	4

UNIT - IV

7	a.	Explain the working principle of a spectrum analyzer with a neat block diagram.	10
	b.	Explain the operation of a frequency selective wave analyzer with a neat diagram.	10
8	a.	Explain instrumentation amplifier with a neat schematic diagram.	10
	b.	List out any six objectives of a Data acquisition system.	6
	c.	With a neat block diagram, explain single channel data acquisition system.	4

UNIT - V

9	a.	Explain the operation of a Digital Storage oscilloscope with a block diagram and sketch the system waveform.	10
	b.	Explain the operation of Bistable Analog storage oscilloscope with diagram.	10
10	a.	Explain the operation of frequency synthesizer with a neat block diagram and sketch the system waveforms.	10
	b.	Mention the applications of digital storage oscilloscopes with necessary waveforms.	10

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