## B.E. Instrumentation Engineering Third Semester IN305 – Electronics Measurements

P. Pages : 2 Time : Three Hours		2         GUG/W/18/151           ree Hours         * 1 1 2 1 *           Max. Marks :	7/ <b>18/1512</b> Marks : 80	
	Note	<ul> <li>es: 1. Same Answer book must be used for each question.</li> <li>2. All questions carry marks as indicated.</li> <li>3. Assume suitable data wherever necessary.</li> <li>4. Illustrate your answers wherever necessary with the help of neat sketches.</li> </ul>		
1.	a)	Describe different types of standards in details.	8	
	b)	Three resistors have the following ratings : $R_1 = 37\Omega \pm 5\%$ , $R_2 = 75\Omega \pm 5\%$ , $R_3 = 50\Omega \pm 5\%$ Determine the magnitude & limiting error in ohm & in percent of resistance of these resistances connected in series.	8	
		OR		
2.	a)	Describe different types of errors.	8	
	b)	A circuit was tuned for resonance by eight different students, & the values of resonant frequency in KHz were recorded as 532, 548, 543, 535, 546, 531, 543 & 536. Calculate : i) arithmetic mean iii) average deviation v) variance.	8	
3.	a)	Describe the constructional details & principle of operation of D'Arsonval – galvanometer. Derive the expression of torque equation for steady state deflection.	8	
	b)	Design a multi-range d.c. milli-ammeter using a basic movement with an internal resistance $R_m = 50\Omega$ & a full scale – deflection current $I_m = 1mA$ . The range required are $0 - 10$ mA, $0 - 50$ mA, $0 - 100$ mA and $0 - 500$ mA.	8	
		OR		
4.	a)	Explain why PMMC instruments are the most widely used instruments. Discuss their advantages & disadvantages.	8	
	b)	Design a series type ohmmeter. The movement to be used requires 0.5 mA for full scale deflection & has an internal resistance of $50\Omega$ . The internal battery has a voltage of 3V. The desired value of half scale resistance is $3000\Omega$ . Calculate the values of series & parallel resistances $R_1 \& R_2$ .	8	
5.	a)	Classify the resistances from the point of view of measurements. Also describe in brief the different methods used for measurement of medium resistances.	8	

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b) The four arms of a wheatstone bridge are as follows –  $AB = 100\Omega$ ,  $BC = 10\Omega$ 

 $CD = 4\Omega, DA = 50\Omega$ 

The galvanometer has a resistance of  $20\Omega$  & is connected across BD. A source of 10V d.c. is connected across AC. Find the current through the galvanometer. What should be the resistance in arm DA for no current through the galvanometer.

## OR

6.	a)	Describe the circuit of a Kelvin's Double Bridge used for measurement of low resistances.	8
		Also derive the condition for balance.	

- b) Discuss how an unknown capacitance can be measured with the help of D'Sauty's bridge.
   8 What are the limitations of this bridge & how are they overcome?
- 7. a) Describe the circuit diagram and operation of a true rms reading voltmeter using thermocouples. Also explain how these voltmeters are free from waveform errors.
  - b) List different methods of digital voltmeters, and explain any one method in detail with neat circuit diagram.

## OR

8.	a)	Explain the working of Q – meter with neat circuit diagram. Also give its applications.	8
	b)	Explain with the help of a block diagram, the various parts of an electronic multimeter.	8
9.	a)	Draw & explain the block diagram of a general purpose CRO.	8
	b)	Describe the principle of operation & basic block diagram of digital – storage oscilloscope.	8
		OR	

- **10.** a) Discuss the advantages & disadvantages of analog & digital type of oscilloscope.
  - b) Describe the function of attenuators in CRO's. Explain how are they designed with **8** particular reference to frequency compensation.

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