

## Tutorial-2

1) A circuit was tuned for resonance by eight different students and the values of resonant frequency in KHZ were recorded as 532,548,543,535,546,531,543 and 536. Calculate:

i)Arithmetic mean, ii)Average deviation, iii)Standard deviation, iv)Probable error of one reading, v)Probable error of the mean.

2) The following ten observations were recorded when measuring a voltage: 41.7, 42.0,41.8,42.0,42.1,41.9,42.0,41.9,42.5,41.8 volts. Find:

i)Arithmetic mean, ii)Average deviation, iii)Standard deviation, iv)Probable error(of one reading & of mean).

Hint: probable error of one reading( $r$ ) =  $0.6745 \times \text{S.D.}$

probable error of mean=  $r / \sqrt{(n-1)}$

3) The resistance of the moving coil voltmeter is 12Kohm.The moving coil has 100 turns and is 4cm long and 3cm wide.The flux density in the air gap is  $6 \times 10^{-2} \text{Wb/m}^2$ .Find the deflection produced by 300volt if a spring control gives a deflection of one degree for a torque of  $25 \times 10^{-7} \text{Nm}$ .

4) The coil of a moving coil meter has 200 turns,wound on a non inductive former,its width being 2cm and height 2.5cm.It works in a constant field of 0.1T.If the control spring produces a torque of  $100 \times 10^{-7}$ ,calculate the current in the coil to produce a deflection of  $72^\circ$  .

5) A moving coil milli-voltmeter has a resistance of 20 Ohm and a full scale deflection of  $120^\circ$  is reached when a potential difference of 100mV is applied across its terminals.The moving coil has the effective dimensions of  $3.1\text{cm} \times 2.6\text{cm}$  and is wound with 120 turns.The flux density in the air gap is 0.15T.Determine the control constant of the spring and suitable diameter of the copper wire for coil winding if 55% of the total instrument resistance is due to the coil winding. (Resistivity for Cu= $1.73 \times 10^{-6} \text{Ohm-cm}$ ).

6) Design an Ayrton shunt to provide an ammeter with current ranges of 1A, 5A and 10A. A D'Arsonval movement with an internal resistance  $R_m=50\Omega$  and full scale deflection current of 1mA is used in the configuration.