

National Institute of Technology, Delhi

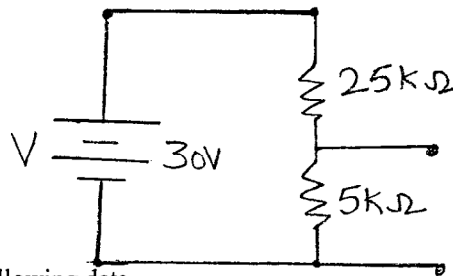
Name of the Examination: B. Tech. MakeUp

Branch	: ECE	Semester	: 4 TH
Title of the Course	: ELECTRONIC MEASUREMENT AND INSTRUMENTATION	Course Code	: ECB-254

Time: 3 Hours

Maximum Marks: 50

- Q1. A 500mA voltmeter is specified to be accurate with $\pm 2\%$. Calculate the limiting Error when instrument is used to measure 300mA. [2]
- Q2. Two different voltmeters are used to measure the voltage across R_b in the circuit of fig.1 [5]
- The meters are as follows.
- Meter 1: $S=1\text{k}\Omega/\text{V}$, $R_m=0.2\text{k}$, range 10V.
- Meter 2: $S=20\text{k}\Omega/\text{V}$, $R_m=1.5\text{k}$, range 10V.
- Calculate (i) voltage across R_b without any meter across it (ii) voltage across R_b when meter 1 is used (iii) voltage across R_b when meter 2 is used (iv) error in the voltmeters.



- Q3. A moving coil instrument has the following data. [5]
- Number of turns=100, Width of the coil=20mm, Depth of the coil=30mm, Flux density in the gap= 0.01Wb/m^2
- Calculate the deflecting torque when carrying current of 10mA. Also calculate the deflection, if the control spring constant is $2 \times 10^{-6}\text{Nm/degree}$.
- Q4. (a) Explain with a diagram how Hay's bridge can be used to measure unknown inductance. Also draw and explain its phasor Diagram. [6]
- (b) An unbalanced Wheatstone Bridge is given in Fig. 2. Calculate the current through the galvanometer. [4]
- Q5. (a) Derive the expression for the Gauge factor. [5]
- (b) A resistance strain Gauge with a Gauge factor of 2 is cemented to a steel member, which is subjected to a strain of 1×10^{-6} . If the original resistance value of the gauge is 130Ω , calculate the change in resistance. [3]
- Q6. (a) Explain with help of a Diagram and characteristics the operation of LVDT. [5]
- (b) A platinum resistance thermometer has a resistance of 100Ω at 25°C . Find its resistance at 50°C . The resistance temperature coefficient of platinum is 0.00392. If the thermometer has a resistance of 200Ω , calculate the value of temperature. [5]
- Q7. (a) Explain with the help of Block diagram the operation of a Dual trace CRO. State the functions of each block. Also explain its operation in alternate mode, chop mode and X-Y mode along with waveforms. [6]
- (b) Estimate the Bandwidth of CRO, if signal of $12\mu\text{s}$ rise time is observed as the signal with $15\mu\text{s}$ rise time. [4]