Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**: Electrical & Electronics Engineering**	**Semester**	**: 3rd**
Title of the Course	**: Electrical & Electronic Measurements**	**Course Code**	**: EEB 202**

Time: 3 Hours **Maximum Marks: 50**

Note : 1. Do not write anything on the question paper except Roll number

2. Assume any data suitably if found missing

Section A: Answer all 10 multiple choice questions. Each question carries 01 mark. [10×1=10]

A1. A null type instrument compared to a deflection-type instrument has

(a) a lower sensitivity (b) a faster response (c) a higher accuracy (d) all the above

A2. The smallest change in a measured variable which an instrument will respond is

(a) resolution (b) precision (c) sensitivity (d) accuracy

A3. The errors mainly caused by human mistakes are

(a) systematic error (b) instrumental error (c) observational error (d) gross error

A4. Electrostatic type instruments are primarily used as.

(a) ammeters (b) voltmeters (c) wattmeter's (d) ohmmeters

A5. Which instrument has highest frequency range with accuracy within reasonable limits?

(a) PMMC (b) Moving iron (c) Electrodynamometer (d) Rectifier

A6. Ratio error of CT is due to

(a) Secondary winding impedance (b) load impedance (c) no load current (d) all the above

A7. Controlling torque in meggar is provided by

(a) Control springs (b) balance weights (c) control coil (d) any of these

A8. Wheatstone bridge is not preferred for precision measurements because of errors due to

(a) Resistance of connecting leads (b) resistance of contacts

(c) thermo electric emf (d) all of these

A9. The potentiometer is standardized for making it

(a) precise (b) accurate

(c) accurate and precise (d) accurate and direct reading

A10. Frequency can be measured using

(a) Andersons bridge (b) Maxwells bridge (c) De Sauty's bridge (d) Weins bridge

Section B: Answer any 4 questions. Each question carries 5 marks. **[4×5=20]**

B1. A 1500/5A, 50 Hz single turn primary type CT has a secondary burden comprising of a pure resistance of 1.5 Ω. Calculate the flux in the core, ratio error and phase-angle error at full load. Neglect leakage reactance and assume the iron loss in the core to be 3W at full load. The magnetizing ampere-turns is 150.

B2. The following readings were obtained during measurement of inductance of a coil on an ac potentiometer: Voltage drop across 0.1 Ω standard resistor connected in series with the coil = $0.613\angle 12.6^{o}V$. Voltage across the test coil through a 100:1 volt-ratio box = $0.781\angle 50.48^{o}V$. Frequency 50Hz. Determine the value of the inductance of the coil.

B3. Explain the construction and working principle of vibrating reed frequency meter.

B4. Describe the constructional details and working of three phase dynamometer type power factor meter. Prove that the displacement of the moving system is equal to the phase angle of the system.

B5. Describe with suitable schematic diagram, the Varley loop test for localizing earth fault in low voltage cables.

Section C: Answer any 2 questions. Each question carries 10 marks. **[2×10=20]**

C1. **(a)** Write down the procedure for standardization of a dc potentiometer. How can it be used for calibration of ammeters and voltmeters? **[5]**

(b) Describe the construction and working of an ac coordinate-type potentiometer. **[5]**

C2. Derive the equation for actual transformation ratio & phase angle error of potential transformer with the help of neat phasor diagram. Also explain the measures to be taken in the design of PT to decrease various errors.

C3. **(a)** Derive the equations for balance for an Anderson bridge. What are its advantages and disadvantages? **[5]**

(b) Describe the working of Schering bridge for the measurement of capacitance and dissipation factor. Derive the relevant equations and draw phasor diagram under balance conditions. **[5]**