Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VI Examination-Nov/Dec-2011

Subject code: 160905   **Date: 30/11/2011**
Subject Name: Electrical & Electronics Measurement
Time: 10.30 am -1.00 pm   **Total marks: 70**

Instructions:
   1. **Attempt all questions.**
   2. **Make suitable assumptions wherever necessary.**
   3. **Figures to the right indicate full marks.**

Q.1 **(a)** How the errors are classified in electrical measurement system? Explain in brief.   **07**
   (b) A Maxwell's capacitance bridge is used to measure an unknown inductance in comparison with capacitance. The various values at the balance are: **07**
   R2= 400 Ω, R3=600 Ω, R4= 1000 Ω, C4= 0.5 μ F
   Calculate values of R1 and L1. Also calculate storage (Q) factor of coil if frequency is 1000 Hz.

Q.2 **(a)** Describe the working of low voltage Schering bridge. Derive the equation for capacitance and dissipation factor.   **07**
   (b) Explain how Wein's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameter.   **07**
OR
   (b) The following 10 observation were recorded when measuring a voltage: 41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.0, 41.9, 42.5, and 41.8 volt. Find (1) The mean (2) The standard deviation (3) The probable error of one reading (4) The probable error of mean (5) range.   **07**

Q.3 **(a)** Draw the circuit of a Wheatstone bridge and derive the condition of balance.   **07**
   (b) Draw the circuit of Kelvin's double bridge used for measurement of low resistance. Derive the condition for balance.   **07**
OR
Q.3 **(a)** What are the different difficulties encountered in the measurement of high resistance? and Explain how these difficulties are over come.   **07**
   (b) State the methods for measurement of high resistance and Explain the construction and working of meggar.   **07**

Q.4 **(a)** Describe the varley loop test for localization of ground and short circuit fault in cables.   **07**
   (b) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase angle errors.   **07**
OR

Q.4 **(a)** In the test for a fault to earth by murry loop test, the faulty cable has a length of 5.2 km. The faulty cable is looped with a sound cable of the same length and cross section. The resistances of ratio arms are 100Ω and 41.2Ω at balance. Calculate the distance of the fault from the test end. If the decade resistance boxes forming the ratio arms have limits of error of ±0.5% of dial reading. What is the limit of error in the above calculated result? **07**

(b) Define the following. **07**
(1) Transformation ratio
(2) Nominal ratio
(3) Turns ratio
(4) Ratio correction factor
(5) Burden

Q.5 **(a)** Explain the construction and operation of flux meter. **07**
(b) Explain frequency selective wave analyzer with block diagram. **07**

OR

Q.5 **(a)** Describe the method for determination of B-H curve of magnetic material. **07**
(b) Explain Heterodyne wave analyzer with block diagram. **07**

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