Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Summer Examination-2022

Subject Name : Electrical & Electronics Measurement

Subject Code : 4TE04EEM1 **Branch: B.Tech (Electrical)**

Semester: 4 **Date: 06/05/2022** **Time: 11:00 To 02:00** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) A 0-300V voltmeter has an error of ±2% of full scale deflection. What would be the range of readings if true voltage is 30V? (01)

b) A 0-10A ammeter has guaranteed accuracy of 1% of full scale deflection. The limiting error while reading 2.5A is, (01)
a) 1% b) 2% c)4% d) none of above

c) Define the following terms related to instrument transformer, (01)
a) Transformation ratio b) Ratio correction factor

d) Anderson's bridge is used for measurement of _____(fill in the blank). (01)

e) Wein bridge is used for measurement of _____(fill in the blank). (01)

f) Wheastone Bridge is used for measurement of ----------.(fill in the blank) (01)

g) List out different methods used for measurement of medium resistance. (01)

h) List out different methods used for measurement of high resistance. (01)

i) List out different methods used for testing ferro-magnetic materials. (01)

j) Blavier test is used for----------.(fill in the blank) (01)

k) Ballistic tests are used in magnetic measurement for _____ (01)
   a) For finding out iron losses in Specimen
   b) Determination of flux density, magnetizing force and B-H curve and hysteresis loop of the specien.
   c) For finding out eddy current loss in specimen.
   d) None of the above

l) A wave analyser is a voltmeter which can be accurately tuned to measure the amplitude of single frequency within a band of about ----------(fill in the blank) (01)

a) 10HZ to 40 MHZ b) 0HZ to 5HZ

c) 5HZ TO 10HZ d) 10GHZ TO 100GH

m) Give application of spectrum analyser. (01)

n) What is inter modulation distortion? (01)

Attempt any four questions from Q-2 to Q-8

Q-2		Attempt all questions	(14)
	1	Errors in measurement can be classified as , 1)Gross errors 2) Systematic errors,3)Random errors. Explain these errors by giving suitable examples. Discuss the means adopted to minimize these errors.	(07)
	2	Describe the working of Hay's bridge for measurement of inductance. Derive the equation for balance and draw the phasor diagram under condition of balance. Why is this bridge suited for measurement of inductance of high Q coils?	(07)
Q-3		Attempt all questions	(14)
	1	Describe the working of a low voltage schering bridge. Derive the equations for capacitance and dissipation factor. Draw the phasor diagram of bridge under balance conditions.	(07)
	2	The four arms of a Maxwell's capacitance bridge at balance condition are:arm ab, an unknown inductance L1, having an inherent resistance R1,:arm bc, a non inductive resistance of 1000Ω,:arm cd, a capacitor of 0.5 F in parallel with a resistance of 1000Ω.:arm da, a resistance of 1000Ω. Derive the equation of balance for the bridge and determine the value of R1 and L1. Draw the phasor diagram of the bridge under balance condition.	(07)
Q-4		Attempt all questions	(14)
	1	Draw the circuit of wheatstone bridge and derive the conditions of balance.	(07)
	2	Draw the circuit of Kelvin's Double Bridge used for measurement of low resistance. Derive the condition for balance.	(07)
Q-5		Attempt all questions	(14)
	1	Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase error.	(07)
	2	Explain the Absolute Null method for testing of a potential transformer.	(07)
Q-6		Attempt all questions	(14)
	1	Explain construction and working of a Magnetic Potentiometer.	(07)
	2	Describe the method for determination of B-H curve of a magnetic material using: 1)Method of reversals 2) Step by step method	(07)

Q-7		Attempt all questions	**(14)**
	1	Describe Murray loop test and Varley loop test for finding location of fault in cable.	**(07)**
	2	Write short note on spectrum analyser & give its application.	**(07)**
Q-8		Attempt all questions	**(14)**
	1	Draw and explain block diagram of Cathode Ray Oscilloscope (CRO) in brief.	**(07)**
	2	Explain the term total harmonic distortion. Describe the function of total harmonic distortion meter.	**(07)**