Code No.: EC743PE/EC724OE	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Supply) – April - 2025
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Common for ECE, CSE)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1.	a)	Define Fidelity and Lag.	[2M]
	b)	A (0-10)A ammeter with an accuracy error of ± 1 %.If we measure true value of 2.5 A with this meter then find the % Limiting error.	[2M]
	c)	List the applications of wave analyzers.	[2M]
	d)	What is the difference between a simple signal generator and a sweep generator?	[2M]
	e)	Distinguish between analog and digital storage oscilloscope.	[2M]
	f)	A Lissajous pattern on an oscilloscope is stationary and has 5 horizontal tangencies and 2 vertical tangencies. The frequency of horizontal input is 1000Hz. Determine the frequency of vertical input.	[2M]
	g)	Define Gauge factor for transducer and explain its significance.	[2M]
	h)	A Piezo -electric crystal having dimensions of 5mm×5 mm× 1.5 mm and a voltage sensitivity of 0.055 V -m/N is used for force measurement .Calculate the force if the voltage develop is 100 V.	[2M]
	i)	A balanced wheat stone bridge has no current flowing through the galnometer. What is the relation between the resistances in the bridge when it is balanced?	[2M]
	j)	Define humidity and moisture.	[2M]

PART-B **(50 Marks)**

2.		Design a series type ohmmeter .The movement to be used requires 0.5ma for full scale deflection and has an internal resistance of 50 Ω .The internal battery has a voltage of 3V.The desired value of half scale resistance is 3000Ω. Calculate (i) the value of series and parallel resistances R_1 and R_2 (ii)the range of R_2,if the battery voltage may vary from 2.7 V to 3.1 V use the value of R_1 in (i).	[10M]
		OR	
3.		Draw the circuit diagram of series type, and shunt type Ohmmeters and explain its operation in detail.	[10M]
4.		What is a Spectrum Analyzer? Discuss in detail its working principle and applications of Spectrum Analyzer with a neat block diagram.	[10M]
		OR	
5.		What is AF oscillator? Explain its operation with a circuit diagram.	[10M]

6. Explain the concept of Dual trace oscilloscope along with circuit diagram. [10M]

7. An electrostatically deflected cathode ray tube has plane parallel deflecting plates which are 2.5 cm long and 0.5 cm apart, and the distance from their centers to the screen is 20 cm. The electron beam is accelerated by a potential difference of 2500 V and is projected centrally between the plates. Calculate the deflecting voltage required on cause the beam strike a deflecting voltage and find the corresponding deflection of the screen. [10M]

8. Explain the working and applications of LVDT in detail with neat diagram. [10M]

OR

9. A barium titanate pickup has the dimensions of 5 mm × 5 mm × 1.25 mm. The force acting on it is 5N .The charge sensitivity of barium titanate is 150pC/N and its permittivity is 12.5×10^{-9} F/m .If the modulus of elasticity of barium titanate is 12×10^{6} N/m^2,Calculate the strain ,charge and the capacitance. [10M]

10. Explain the working of Maxwell bridge for measurement of inductance. Derive the equations for Maxwell bridge when it is balanced. [10M]

OR

11. Explain in detail about Data Acquisition Systems (DAS). State the different ways in which multichannel DAS are used. [10M]

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