Question Paper

Exam Date & Time: 25-Jan-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

III Semester Make Up Examination

ELECTRONIC MEASUREMENTS [ICE 2153]

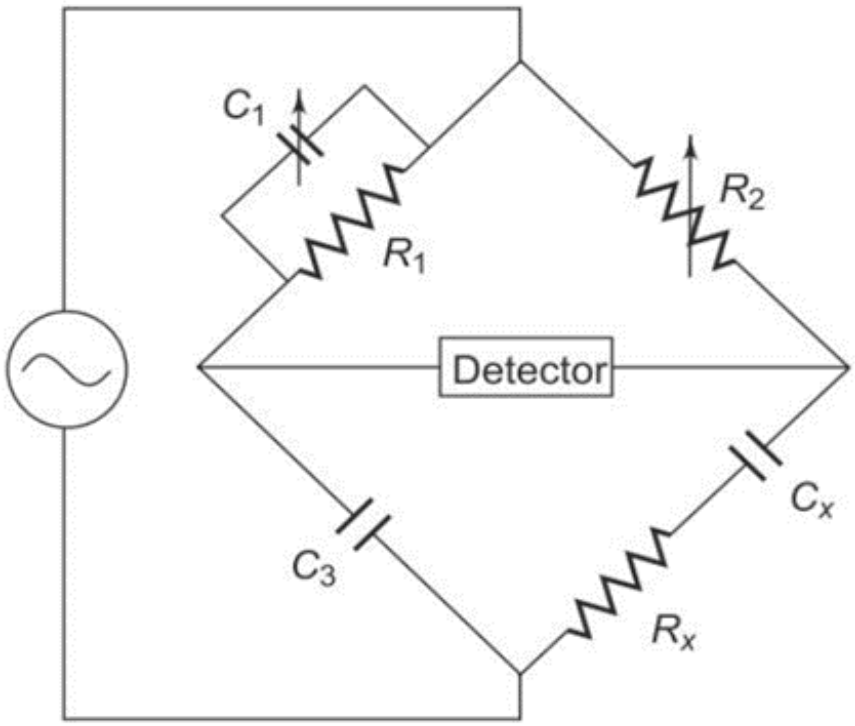
Marks: 50 **Duration: 180 mins.**

Descriptive Questions

Answer all the questions. Section Duration: 180 mins

1) For the bridge shown in the figure below, derive the expression for C_x and R_x. Calculate C_x, when R_1= 2 Ohm, R_2= 4 Ohm and C_1= 10 micro-Farad and C_2= 5 micro-Farad. [CO1, PO1, PO2, PO3, PO12, BL3] (4)

A)



B) Why digital energy meter is preferred over analog energy meter? List out the disadvantages of analog energy meter. [CO1, PO1, PO2, PO3, PO12, BL2**]** (3)

C) Which bridge is appropriate for the measurement of inductance? Draw the circuit diagram and find the expression for the inductance (L). [CO1, PO1, PO2, PO3, PO12, BL3] (3)

2) Draw the block diagram of sampling oscilloscope. Explain how it can handle high frequency signal with low band width devices. [CO2, PO5, PO12, BL3] (5)

A)

B) Draw the block diagram of Digital Storage Oscilloscope (DSO) and explain the functions of all the components of the block diagram. [CO2, PO5, PO12, BL2] (3)

C) With an appropriate circuit diagram, explain the working of single-phase energy meter. [CO1, PO1, PO2, PO3, PO12, BL2] (2)

3) Draw the block diagram of dual slope type voltmeter and explain its working. Explain how it is different than the integrating type of voltmeter. [CO3, PO3, PO5, BL4] (5)

A)

B) DAC is 4 bit, reference voltage is 5V. Draw the circuit diagram and give equation for conversion using R-2R ladder DAC and binary weighted DAC. Compute the output in each case for binary input of 0110. [CO3, PO3, PO5, BL4] (3)

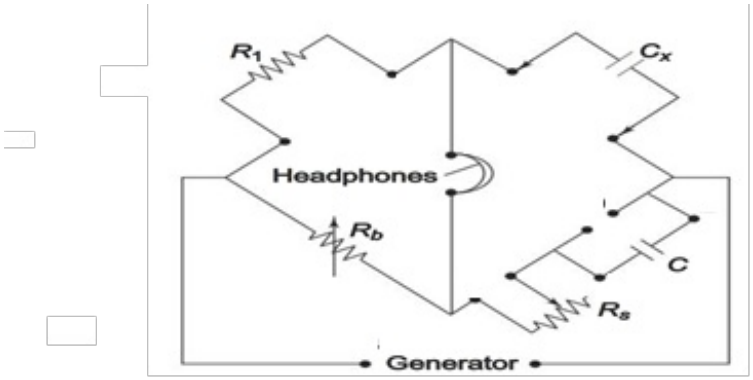
C) Draw functional block diagram and explain the working of flash ADC in brief. [CO3, PO3, PO5, BL2] (2)

4) Draw the circuit diagram of LCR meter. Explain with appropriate circuit diagram how value of R (resistance) is calculated. [CO4, PO5, BL2] (4)

A)

B) Explain the working principle of Galvanometric type recorder. Write the advantages of heat-based stylus over ink-based stylus. [CO4, PO5, BL2] (3)

C) Derive the expression for Cx. Calculate Cx, when C= 2 micro-Farad, R_1 = 1000 Ohm, R_b = 2000 Ohm and R_s=100 Ohm. [CO4, PO5, BL3] (3)



5) What is importance of the balanced mixer in heterodyne wave analyser? Explain its working using any 4 numerical examples. [CO5, PO1, PO2, PO3, PO5, BL2] (2)

A)

B) Draw fundamental sine waveform and its second harmonic. Draw distorted signal having fundamental and only second harmonic with amplitude equal to 20% of the fundamental frequency amplitude. How much is the total harmonic distortion of pure sine wave and why? [CO5, PO1, PO2, PO3, PO5, BL3] (3)

C) Draw the following waveforms and state the inferences for the following: (5)

i. Sine wave: time and frequency domain

ii. Square wave: time and frequency domain

iii. Pulse width modulation, pulse amplitude modulation: Time domain

iv. AM modulation: Time and frequency domain

v. Symmetrical and asymmetrical spectrum in frequency domain

[CO5, PO1, PO2, PO3, PO5, BL4]

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