



## **BRAINWARE UNIVERSITY**



## Term End Examination 2023 Programme – B.Tech.(ECE)-2019/B.Tech.(ECE)-2020 Course Name – Electronic Instrumentation and Measurement Course Code - OEC601A ( Semester VI )

| Full Marks: 60  [The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.] |                                                                                                                      |                                                                                       |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
|                                                                                                                                                          | <b>Group</b><br>(Multiple Choice Ty                                                                                  |                                                                                       |  |
| 1.                                                                                                                                                       | Choose the correct alternative from the following                                                                    |                                                                                       |  |
| (i)                                                                                                                                                      | A moving-coil permanent-magnet instrument caresistance shunt.                                                        | n be select as by using a low                                                         |  |
| (ii)                                                                                                                                                     | <ul><li>a) ammeter</li><li>c) flux-meter</li><li>For measurements on high voltage capacitors, t</li></ul>            | b) voltmeter<br>d) ballistic galvanometer<br>he suitable bridge can apply             |  |
| (iii)                                                                                                                                                    | <ul><li>a) Wein bridge</li><li>c) Schering bridge</li><li>Write, In electrical measuring instruments elect</li></ul> | b) Modified De Santy's bridge<br>d) none of the above<br>rical energy is converted to |  |
| (iv)                                                                                                                                                     | <ul><li>a) Mechanical energy</li><li>c) Chemical energy</li><li>Bar express as the unit of</li></ul>                 | b) Heat energy<br>d) Light energy                                                     |  |
| (v)                                                                                                                                                      | <ul><li>a) Temperature</li><li>c) Atmospheric pressure</li><li>Calculate error of measurement =</li></ul>            | b) Heat<br>d) Current                                                                 |  |
| (vi)                                                                                                                                                     | a) True value – Measured value<br>c) Measured value – Precision<br>Error due to eye vision observe is termed as      | b) Precision – True value<br>d) None of the above                                     |  |
| (vii)                                                                                                                                                    | <ul><li>a) climax error</li><li>c) parallax error</li><li>Noise establish as a function of</li></ul>                 | b) sight error<br>d) visional error                                                   |  |
|                                                                                                                                                          | a) voltage<br>c) bandwidth                                                                                           | b) current<br>d) frequency                                                            |  |

(viii) In a Wheatstone bridge method, the bridge is said to be balanced, when the current

b) 0 A

d) Half of the maximum value

indicate

c) Maximum

a) 1 A

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| (ix) In function generator, the output waveform                                                                                                                                                                                                                                                        | of integrator express wave                                                                                                                           |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| a) Sinusoidal<br>c) Triangular                                                                                                                                                                                                                                                                         | b) Square<br>d) Saw-tooth                                                                                                                            |                          |
| <ul> <li>(x) Q meter choose to measure the properties of a) Inductive coils</li> <li>(x) Capacitive coils</li> <li>(xi) Write, With the increase in the intensity of limits and increases</li> </ul>                                                                                                   | <ul><li>b) Non inductive coils</li><li>d) Both (a) and (c)</li></ul>                                                                                 |                          |
| <ul> <li>a) Increases</li> <li>c) Remains same</li> <li>(xii) The Wien's bridge is select, for the measuren</li> </ul>                                                                                                                                                                                 | d) None of these                                                                                                                                     |                          |
| a) Less than 100 Hz c) 1 kHz to 100 MHz (xiii) Select the bridge, suitable for the measurement                                                                                                                                                                                                         | b) 100 Hz to 100 kHz<br>d) More than 100 MHz                                                                                                         |                          |
| <ul><li>a) Anderson's bridge</li><li>c) Owen's bridge</li><li>(xiv) Under balanced condition, select the current</li></ul>                                                                                                                                                                             | <ul><li>b) Hay's bridge</li><li>d) None of These</li><li>flowing through the detector is equal to</li></ul>                                          |                          |
| a) 1 A c) Sum of the currents flowing in the                                                                                                                                                                                                                                                           | <ul><li>b) 0 A</li><li>d) Difference between the current flow<br/>the</li></ul>                                                                      | ing in                   |
| <ul><li>(xv) State, Oscilloscope is</li><li>a) a ohmmeter</li><li>c) a voltmeter</li></ul>                                                                                                                                                                                                             | b) an ammeter<br>d) a multimeter                                                                                                                     |                          |
|                                                                                                                                                                                                                                                                                                        | oup-B                                                                                                                                                |                          |
| (Short Answer                                                                                                                                                                                                                                                                                          | Type Questions)                                                                                                                                      | 3 x 5=15                 |
| <ul> <li>3. Compare a true RMS voltmeter with an AC voltmeter.</li> <li>4. How is an electron beam focus onto a fine spot on the face of the CRT?</li> <li>5. Tell the function of aquadag.</li> </ul>                                                                                                 |                                                                                                                                                      | (3)<br>(3)<br>(3)<br>(3) |
| Write the significance of sensitivity in voltmeters                                                                                                                                                                                                                                                    | ?                                                                                                                                                    | (3)                      |
| <b>Gro</b> o<br>(Long Answer T                                                                                                                                                                                                                                                                         | up-C<br>ype Questions)                                                                                                                               | 5 x 6=30                 |
| <ol> <li>Draw the basic block diagram of an oscilloscope</li> <li>Explain with diagram the operation of Wheatsto</li> <li>A PMMC instrument has a coil of dimensions 20 gap is 1.8 X 10-3 wb/m² and the spring constant of turns required to produce an angular deflec of through the coil.</li> </ol> | one bridge.<br>mm X 15mm. The flux density in the air<br>is 0.15 X 10 <sup>-6</sup> Nm/V. Calculate the numbe                                        |                          |
| <ol><li>Explain the terms a) Static Error b) Static Correct<br/>Error.</li></ol>                                                                                                                                                                                                                       | ion c) Relative Error d) Percentage Relativ                                                                                                          | e (5)                    |
| 11. The focusing system in a CRT is known as electrols. The arms of an ac Maxwell's bridge are arranged resistors of 100 Ω each, DA a standard variable reconsists of a standard variable resistor R in series balance was found with L1=50 mH and Z=1.36R.                                            | as follows: AB and BC are non-reactive eactor L1 of resistance 32.7 $\Omega$ and CD with a coil of unknown impedance Z, Express the R and L of coil. | (5)<br>(5)               |
| A Maxwell bridge is used to measure inductive in are C1=0.01 $\mu$ F, R1=470 K $\Omega$ , R2=5.1 K $\Omega$ and R3=1 the unknown impedance.                                                                                                                                                            | npedance. The bridge constants at balanc                                                                                                             | :e (5)                   |