

**Maharashtra Institute of Technology, Aurangabad**

(An Autonomous Institute)

END SEMESTER EXAMINATION

**Second Year B.Tech (Electrical Engg.) – Feb/Mar-2023**

Course Code : EED201 Course Name : Electrical Measurement &amp; Instrumentation

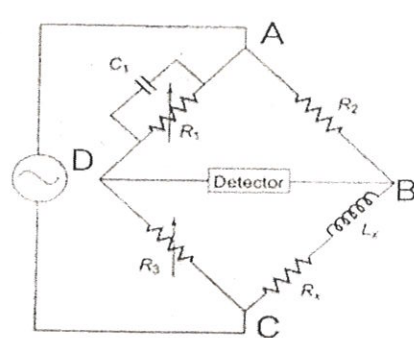
Duration : 2 Hrs Max. Marks : 50 Date : 3.2.2023

Instructions :

03 FEB 2023

- i) All questions are compulsory  
 ii) Assume suitable data wherever necessary and clearly state it  
 iii) Figures to right indicate full marks

Q. 1	Answer any five(Marks:10)	Marks	CO	BL	PI
a)	Recall the principle of Energy meter.	2	2	1	1.3.1
b)	Illustrate with diagram, the bourden tube pressure gauge.	2	1	3	1.3.1
c)	Why calibration of Instrument is needed?	2	6	3	2.1.3
d)	Define the desirable dynamic characteristics.	2	2	1	2.2.3
e)	Calculate the unknown resistor Rx and draw the Wheatstone bridge if, $R_1=30k\Omega$ ; $R_2=40k\Omega$ ; $R_3=60k\Omega$ .	2	3	5	1.3.1
f)	What are the advantages of Instrument transformers?	2	2	1	1.3.1
g)	Enlist the points for selection of transducers.	2	4	4	1.3.1
h)	Show the constructional diagram of Induction type wattmeter.	2	5	2	2.1.1
<b>Q.2</b>	<b>Answer/Solve any one of the following.</b>				
	a.) Derive the equation for measurement of power in DC and AC circuits.	8	4	3	4.1.1
	b.) What the damping devices in Indicating Instruments? Explain each one of them.	8	4	3	4.1.1
<b>Q.3</b>	<b>Answer/Solve any one of the following.</b>				
	a.) How the range of DC ammeter and DC voltmeter can be extended. Derive the expression to find the shunt resistance and multiplier resistance?	8	5	3	4.1.1
	b.) Compare the Current and Potential Transformer.	8	4	3	4.1.1
<b>Q.4</b>	<b>Answer/Solve any one of the following.</b>				
	a.) A moving coil instrument has a resistance of $10\ \Omega$ and gives a full-scale deflection when carrying 50mA. Show it can be adapted to measure voltage upto 750 volts and current upto 100 amperes.	8	3	4	4.1.2
	b.) Explain the principle and working of electronic energy meter.	8	4	3	4.1.1

Q.5	<p><b>Answer/Solve any one of the following.</b></p> <p>a.) Define the following terms applied to instrument transformer</p> <p>i.) Burden of and instrument transformer.</p> <p>ii.) Transformation ratio (Actual) <math>K_{act}</math></p> <p>iii.) Nominal Transformation ratio (Nominal) <math>K_{nom}</math></p> <p>iv.) Turns ratio and Ratio correction Factor.</p>	8	5	4	4.1.2
	<p>b.) A Maxwell bridge (Fig.1) is used to measure inductive impedance. The bridge constant at balance are:</p> <div style="text-align: center;">  <p>Fig.1</p> </div> <p><math>R_1=450k\Omega</math>; <math>C_1=0.01\mu F</math>; <math>R_2=5.1k\Omega</math>; <math>R_3=100k\Omega</math>. Find the series equivalent and of the unknown impedance.</p>	8	3	5	1.3.1
Q.6	<p><b>Answer/Solve any one of the following.</b></p> <p>a.) Describe the construction and working of a single phase induction type of energy meter. Show that the number of revolutions made by its disc during a particular time is proportional to the energy consumed.</p>	8	4	3	4.1.4
	<p>b.)</p> <p>i.) Define transducer. Give its classification.</p> <p>ii.) Draw the generalised data acquisition system</p>	8	2	1	1.3.1