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Name of Examination : **Winter 2020** - (Preview)

Course Code & Course Name : **IN202U - Measurement Techniques**

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Maximum Marks : **60**

Duration : **3 Hrs**

[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

1) Answer any two sub-questions

- a) Explain alternate and chop mod in dual trace oscilloscope [6]
- b) With neat schematic explain the construction and working of galvanometric recorder [6]
- c) Explain the construction and working of induction type energy meter [6]

2) Answer all sub-questions

- a) Derive the equation of electrostatic deflection of electron beam in cathode ray oscilloscope [6]
- b) Design an Ayrton shunt to provide an ammeter with current ranges of 1 A, 5 A and 10 A. A basic meter with an internal resistance of 50 Ω and a full scale deflection current of 1 mA is to be used.. [6]

3) Answer any two sub-questions

- a) Explain the construction and working of dynamometer type wattmeter [6]
- b) Draw the circuit diagram for Maxwell bridge and derive the equation for measurement of inductance using the bridge [6]
- c) With neat block diagram explain the working of general instrumentation system [6]

4) Answer any two sub-questions

- a) Draw the circuit diagram of Schering bridge and derive the equation for measurement of capacitance using this bridge [6]
- b) What is bridge sensitivity? Obtain the equation of bridge sensitivity in Wheatstone bridge [6]
- c) State and explain the types of errors in measurement system [6]

5) a) A bridge consists of the following:

1. Arm ab- a choke coil having a resistance R_1 and inductance L_1
2. Arm be- a non-inductive resistance R_3 .
3. Arm cd- a mica condenser C_4 in series with a non-inductive resistance R_4 .
4. Arm da- a non inductive resistance R_2

when this bridge is fed from a source of 500 Hz, balance is obtained under following conditions :

$R_1=2410\Omega$; $R_3=750\Omega$; $C_4=0.35\mu F$; $R_4=64.5\Omega$ The series resistance of capacitor is 0.4Ω . Calculate the resistance and inductance of the choke coil. The supply is connected between a and c and the detector is between b and d.

- b) What do you mean by dynamic characteristic of measurement system? Explain any three dynamic characteristics [04]

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