PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 %   Max Marks: 40   Max Time: 1 hr.   Saturday, 22nd September, 2018

TEST – 1

Odd Semester 2018-19   Course: **EEE/ ECE 209. Electrical and Electronic**   V Sem. EEE/ ECE
Measurement and Instrumentation

Instruction:
  (i)   *Read the question properly and answer accordingly.*
  (ii)   *Question paper consists of 3 parts.*
  (iii) Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 4 M = 12 Marks)

1. State the basic characteristics of an instrument and explain any three of them.

2. Explain the concept of limiting error (LE) and guaranteed accuracy error (GAE)? If a (0-300) V voltmeter has an accuracy of ± 1% then find out the value of %L.E when measuring a true value of 200 V.

3. Explain the concept of sensitivity and loading effect with a simple example.

Part B

(2 Q x 8 M = 16 Marks)

4. With a neat diagram explain in detail the construction and working of PMMC instrument.

5. Derive the torque equation of a moving iron instrument?

Part C

(1Q x 12 M = 12 Marks)

6. The pointer of a moving coil instrument gives full scale deflection of 20mA. The potential difference across the meter when carrying 20mA is 400mV.

(i) If the instrument is intended to be used for 200A for full scale deflection then find the shunt resistance required to be connected across the instrument.

(ii) If the instrument is intended to be used as a voltmeter for full scale reading with 1000V. then find the series resistance required to be connected with this meter.

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TEST 2

Odd Semester: 2018-19

Course Code: : EEE 209

Course Name: Electrical and Electronic Measurement and Instrumentation

Branch & Sem: EEE/ ECE & V Sem.

Date: 24 November 2018

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Instructions:

(i) *Read the question properly and answer accordingly.*

(ii) *Question paper consists of 3 parts.*

(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks.   (3x4=12)

1. A $4\frac{1}{2}$ digit digital voltmeter is in the voltage range of 200 mV. The total counts and resolution of this meter ?

2. A digital multimeter has a read out range from 0 to 9999 counts. When full scale reading is 9.999 volts. The resolution in mV?

3. Two in phase 50 Hz sinusoidal waveforms of equal amplitudes are fed into channel 1 and channel-2 respectively of oscilloscope. Assuming the volt/div, time/div and other settings are exactly the same for both the channels. What Lissajous figure would be observed if the oscilloscope is operated in X-Y mode and why?

Part B

Answer **all** the Questions. **Each** question carries **eight** marks.   (2x8=16)

4. A $3\frac{1}{2}$ digit multi meter has an accuracy specification of 0.5% of reading plus 5 counts. The value of the unknown resistance is read as 50 Ω on the 200 Ω scale of this meter. The maximum error that can be expressed in the reading in ohms ?

5. Explain the function of each of the blocks of a digital multi meter with suitable diagrams?

Part C

Answer the Question. Question carries **twelve** marks.   (1x12=12)

6. An oscilloscope is operated with a time setting of 1 ms/div and volt/div setting of 100mV/div. Three cycles of the sine wave is observed on the screen which occupies 9 horizontal divisions and 4 vertical divisions. Then the peak voltage (in mV) , rms voltage(in mV) and frequency(in Hz) of the sine wave are respectively?

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END TERM FINAL EXAMINATION

Odd Semester: 2018-19

Course Code: EEE 209

Course Name: Electrical and Electronic Measurement and Instrumentation

Programme & Sem: EEE/ ECE & V Sem

Date: 26 December 2018

Time: 2 Hours

Max Marks: 80

Weightage: 40%

Instructions:
(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Explain the working of Heterodyne wave analyzer with the help of block diagram.

2. Explain the working of DSO with the help of suitable block diagram.

3. State any five advantages of electrical transducers.

4. Derive an expression for determining the Quality factor (Q-factor) of a coil using Maxwell's inductance-capacitance bridge.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (4Qx10M=40)

5. With the help of phasor diagram and torque equation, calculate the percentage error in the reading of the wattmeter (in terms of correction factor) due to pressure coil inductance? Assume the load to be capacitative.

6. Write short notes on a) LVDT

OR

b) Harmonic Distortion analyzers

7. A thermistor has a resistance temperature coefficient of -5 % over a temperature range of 25° C to 50° C. If the resistance of the thermistor is 100 Ω at 25° C, then calculate the resistance of the thermistor at 35° C and at 40° C?

8. A compressive force is applied to a structural member. The strain is 5 micro-strain. Two separate strain gauges are attached to a structural member, one is nickel wire strain gauge having gauge factor of -12.1 and other is nichrome wire strain gauge having a gauge factor of 2. The resistance of the gauges before being strained is 120 Ω. Calculate the change in the value of the resistance of the gauges after they are strained?

Part C

Answer **all** the Questions. **Each** question carries **ten** marks.   (2Qx10M=20)

9. The line to line input voltage to a 3 phase 50 Hz star connected balanced AC circuit shown in figure below is 100 V and two wattmeters are connected at the input which are indicated by the circled portion in the figure 1 given below, What would be the wattmeter readings if the phase sequence is RYB?
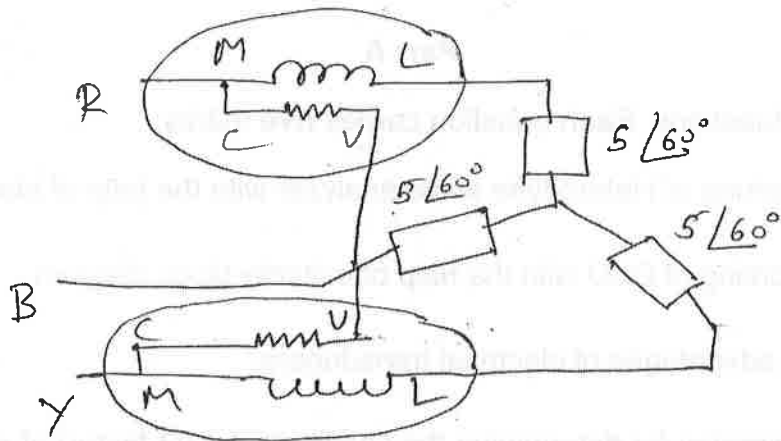

Figure 1

10. A single phase load is connected between R and Y terminals of 415 V, symmetrical, 3 phase 4 wire system with phase sequence RYB. Wattmeter is connected in the system as shown in figure 2 given below. The power factor of the load is 0.8 lagging. Compute the reading of the wattmeter in Watts?
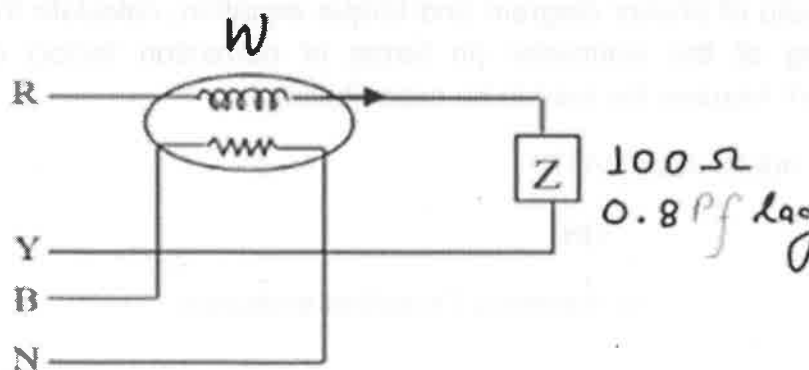

Figure 2