

[71]

Seat No. \_\_\_\_\_

SARDAR PATEL UNIVERSITY  
 B.Sc. - V Semester  
 Date 18/11/2019 Time : 10 am to 1 pm  
 Instrumentation I

Course Code:

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Total Marks: 70

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## Q-1 Multiple Choice questions:

- A resistor has
  - Positive phase angle
  - negative phase angle
  - Zero phase angle
  - Imaginary phase angle
- The unit of sensitivity of current meter is
  - $\mu\text{A}$
  - mm
  - $\text{mm}/\mu\text{A}$
  - $\mu\text{A}/\text{mm}$
- Schering bridge is used to measure capacitance of a capacitor whose phase angle is
  - is nearer to  $90^\circ$ .
  - is lower than  $90^\circ$ .
  - is equal to  $90^\circ$ .
  - None of the above
- In Harmonic distortion analyzer, Wein bridge is used as
  - Low pass filter
  - High pass filter
  - Notch filter
  - Band pass filter
- The modification applied to Hay bridge to measure high Q coil is
  - Connecting a resistor in series to capacitor in arm 1.
  - Connecting a resistor in parallel to capacitor in arm 1.
  - Removing the resistor from arm 1
  - None of above.
- Transducer forms a part of \_\_\_\_\_ in instrumentation system.
  - Input device
  - Output device
  - Processing device
  - modification device
- The capacitance of a capacitor is given by
  - $C = KA\epsilon_0/d$
  - $C = KA/\epsilon_0d$
  - $C = K/A \epsilon_0d$
  - None of the above
- Thermistors are widely used in the temperature range
  - $-100^\circ\text{C}$  to  $100^\circ\text{C}$
  - $-100^\circ\text{C}$  to  $200^\circ\text{C}$
  - $-100^\circ\text{C}$  to  $300^\circ\text{C}$

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LPTO)

(iv) 100°C to 300 °C

9. The piezoelectric property is found in

- (i) Aluminum and Copper
- (ii) Barium Titanite and Rochelle Salt
- (iii) Iron and Manganese
- (iv) None of the above

10. Sensitivity of strain gage is defined as ratio of

- (i) unit change in resistance per unit change in length.
- (ii) unit change in length per unit change in resistance.
- (iii) unit change in radius per unit change in resistance.
- (iv) None of above.

Q-2 Answer any ten questions in brief.

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1. Which step is taken to obtain thevenised equivalent voltage?
2. State two differences between ac and dc bridge.
3. Write two conditions to be fulfilled simultaneously to balance an ac bridge.
4. What is Schering bridge used for?
5. Define power factor for series RC combination.
6. What are the applications of Wein bridge?
7. Classify transducer. Give two examples.
8. Draw diagram showing application of LVDT in Servo system.
9. Give full form of LVDT.
10. What are thermistors? They are prepared from which material?
11. How will you define sensitivity of Strain gauge?
12. Name Asymmetrical crystalline materials.

Q-3 Derive an expression for unknown resistance using commercial Kelvin double bridge.

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OR

Q-3 A. Explain why Maxwell Bridge is unsuited for measurement of high Q coils.

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B. The ac bridge is in balance with following constants. Arm AB,  $R=450 \Omega$ , arm BC,  $R=300 \Omega$  in series with capacitor  $C=0.265 \mu F$  and arm CD unknown, arm DA  $R=200 \Omega$  in series with inductor  $L=15.9$  mH. The oscillator frequency is 1 KHz. Find the constants of arm CD.

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Q-4 Describe Hay bridge and show that it is suitable for the measurement of High Q coil.

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OR

Q-4 Describe in detail Schering bridge.

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Q-5 Discuss in detail working of LVDT in servo system.

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OR

Q-5 Write a short note on Transducer.

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Q-6 Obtain expression for sensitivity of Strain Gauge.

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OR

Q-6 Describe any two characteristics of Thermistors.

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