



III- SEM E&TC /2019(W)(OLD)

ETT-303 ELECTRONICS MEASUREMENT & INSTRUMENTATION

Full Marks: 80

Time : 3 Hours

Answer any FIVE Questions including Q No. 1 & 2
Figures in the right hand margin indicates marks

<p>1. Answer ALL the questions.</p> <p>(a) Define accuracy.</p> <p>(b) Define Transducer.</p> <p>(c) What is multimeter?</p> <p>(d) What is Thermister?</p> <p>(e) What is a Wave Analyzer?</p> <p>(f) What are the advantages of Electrical transducer?</p> <p>(g) What is ohm meter? What are the types of ohm meter?</p> <p>(h) What are the two applications of Oscilloscope?</p> <p>(i) What are Electrophoretic Image Displays (EPID)?</p> <p>(j) List the application of LCR Bridge.</p> <p>2. Answer any SIX questions.</p> <p>a. Discuss the basic principle of operation of DC ammeter.</p> <p>b. Explain working principle of moving iron type instrument.</p> <p>c. Explain working principle of load cell.</p> <p>d. Explain measurement of frequency by digital frequency meter.</p> <p>e. Discuss the static characteristics of a measuring instrument.</p> <p>f. Explain lissajous patterns.</p> <p>g. Explain advantages of LED as indicator.</p> <p>3. Explain LVDT with its advantages and disadvantages.</p> <p>4. Explain principle of operation of ramp type digital voltmeter.</p> <p>5. Discuss the block diagram of simple CRO.</p> <p>6. Explain the measurement of self inductance by Maxwell's bridge.</p> <p>7. Explain the working principle of Audio Frequency Sine and Square wave Generator.</p>	2x10	5x6	10	10	10	10	10
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III-E&TC/E&C/2019(W)(NEW)

Th. 4-ELECTRONICS MEASUREMENT & INSTRUMENTATION

Full Marks: 80

Time : 3 Hours

Answer any Five Questions including Q No. 1 & 2
Figures in the right hand margin indicates marks

<p>1. Answer ALL the questions:</p> <p>(a) Define the terms: Precision and Resolution.</p> <p>(b) List the types of static errors in a measuring instrument.</p> <p>(c) List the types of moving iron instruments.</p> <p>(d) What is an LVDT?</p> <p>(e) Define load cell.</p> <p>(f) Define Strain Gauge.</p> <p>(g) What are the advantages of PMMC instrument?</p> <p>(h) Define a 'Transducer'.</p> <p>(i) What is a function generator?</p> <p>(j) Define lissajous pattern.</p> <p>2. Answer any SIX questions:</p> <p>(a) Explain the operation of a frequency meter with basic circuit diagram.</p> <p>(b) Explain the block diagram of a oscilloscope.</p> <p>(c) Using Wheatstone's bridge, explain the measurement of unknown resistance.</p> <p>(d) Explain working Principle of strain gauge.</p> <p>(e) Explain working principle of thermocouple.</p> <p>(f) Discuss Basic wave analyzer.</p> <p>(g) Discuss the basic Principle of operation of a DC ammeter.</p> <p>3. Explain the principle of operation of Q meter.</p> <p>4. Discuss the static characteristics of a measuring instrument.</p> <p>5. Discuss Shunt type Ohm Meter.</p> <p>6. Discuss the working principle of optical pyrometer.</p> <p>7. Discuss the basic principle of permanent magnet moving coil movement with its advantages and disadvantages.</p>	2x10	5 x6	10	10	10	10	10
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III – Sem/ETC/2019(S)(New)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION
(Code : ETT-303)

Full Marks : 80

Time : 3 hours

Answer any **five** questions including Q. Nos. 1 & 2
Figures in the right-hand margin indicate marks

2 × 10

- Answer all the questions :
 - What is linearity and accuracy ?
 - What do you mean by thermocouple ?
 - Define pyrometry.
 - What is the use of tachometer ?
 - Define sensor.
 - Write the applications of DSO.
 - Differentiate between the AC and DC Bridge.
 - Define error.
 - What is the difference between analog and digital multimeter ?
 - Define LVDT.
- Answer any *six* questions : 5 × 6
 - Explain the operation of analog voltmeter.
 - Explain working principle of DSO with suitable diagram.
 - Define transducer. Explain operation of thermocouple in detail.
 - Draw the block diagram of function generator and also write down its applications.
 - Explain the working principle of PMMC and derive the torque equation.
 - Explain the working principle of AF sine and square wave generation.
 - What are different static characteristics of instruments ?
- What is the use of Wein's bridge ? Draw and derive the expression with suitable diagram. 10
- Explain the principle of capacitive transducer with charge in plate area and give its advantages and disadvantages. 10
- Explain digital frequency meter with suitable diagram. 10
- Explain MI instruments with suitable diagram and also explain its advantages, disadvantages and applications. 10
- Draw and explain Maxwell's bridge. Derive equation for bridge balanced equation for unknown parameter and state its applications. 10

III – Sem/ETC/2019(S)(BP)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION
(Code : ETT-303)

Full Marks : 70

Time : 3 hours

Answer any **five** questions

Figures in the right-hand margin indicate marks

- Define Accuracy. 2
 - Briefly discuss about the Dynamic Characteristics of measuring instrument. 5
 - Explain the principle of operation of MI type instrument with a neat sketch. 7
- What is error of Instrument ? 2
 - Draw a neat diagram of PMMC type instrument and explain its working operation and construction with advantages and disadvantages. 5
 - Describe the working operation of Digital Multimeter. 7
- What do you mean by deadzone ? 2
 - State and explain the operation of LCR meter with a neat diagram. 5
 - Draw the block diagram of CRO and explain each block briefly. 7
- Define transducer. 2
 - Explain working principle of Load Cell. 5
 - With a neat diagram explain the operation of a DSO. 7
- What is Gross error ? 2
 - Discuss the operation of Analog Multimeter. 5
 - Describe the construction and working of LVDT. 7
- State any two application of Digital Tachometer. 2
 - Explain the working principle of AC Voltmeter and its application. 5
 - Briefly describe the measurement of Self Inductance using Hay's Bridge. 7
- What is Q meter ? Why it is used ? 2
 - Write a short note on Thermocouple. 5
 - Describe the working of Dual Trace Oscilloscope with its block diagram. 7



III-Sem/E&TC/2016(W) (New)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

(Code - ETT-303)

Full Marks : 70

Time : 3 Hours

Answer any five questions.

Figures in the right-hand margin indicate marks.

1. (a) Write the static characteristics of an instrument and measurement system. [2]
- (b) Explain the principle of operation of an multirange ammeter. [5]
- (c) Describe the construction and working of PMMC instrument with suitable diagram. [7]
2. (a) State the different errors occur in moving iron instrument. [2]
- (b) Explain the principle of operation of DC voltmeter. [5]
- (c) Describe the principle of working of Wheatstone's Bridge with a neat diagram. [7]
3. (a) What are different types of frequency meters. [2]
- (b) Explain the working of proximity sensor. [5]
- (c) With a suitable diagram, describe the measurement of self-inductance by Maxwell's Bridge. [7]
4. (a) What are the advantages of thermo couple? [2]
- (b) Explain the working of strain gauge with a neat diagram. [5]
- (c) Describe the operation of a function generator with the help of a block diagram. [7]
5. (a) What are the applications of an oscilloscope. [2]
- (b) Explain how capacitance is measured by using schering's bridge with a neat diagram. [5]
- (c) Explain the measurement of phase and frequency by the use of Lissajous methods. [7]
6. (a) State the difference between DC voltmeter and AC voltmeter. [2]
- (b) Explain the resistance-temperature characteristics of a thermistor. [5]
- (c) Explain the function of basic wave analyzer and state its classification. [7]
7. Write short notes on any two : [7 × 2]
 - (i) Digital Tacheometer
 - (ii) Thermocouple
 - (iii) Electrical Transducer
 - (iv) LCR meter.

III/SEM/E&TC/CSE/IT/AE & I
2015 (W)

(Sub Code-ETT-303)

Full Marks : 70

Time : 3 Hours

Answer any five questions.

The figures in the right-hand margin indicate marks.

1. (a) Define Reproducibility. [2]
- (b) Explain the measurement of self inductance using Maxwell's AC bridge. [5]
- (c) With a neat sketch write the working principle of PMMC type moving coil instrument and its advantages and disadvantages. [7]
2. (a) State and balanced equation used in AC bridge. [2]
- (b) Define Transducer. Discuss the classification of transducer. [5]
- (c) Explain the principle of operation of series type ohm meter and write its application. [7]
3. (a) What is deflecting torque? [2]
- (b) Discuss the operation of MI type Instrument. [5]
- (c) What is Digital storage oscilloscope and describe briefly with a neat block diagram? [7]
4. (a) Define sensitivity of Digital meter. [2]
- (b) Briefly explain the dynamic characteristics of a measuring instrument. [5]
- (c) With a neat diagram explain the operation of CRO. [7]
5. (a) State any two uses of thermistor. [2]
- (b) Explain working principle of load cell. [5]
- (c) Discuss the measurement of frequency and working principle of Wien bridge. [7]
6. (a) What is proximity sensor? [2]
- (b) With necessary block diagram explain the principle of operation of frequency meter. [5]
- (c) Describe the working operation of LVDT with a neat diagram. [7]
7. (a) Define Lissajous and write its two uses. [2]
- (b) Draw and explain basic block diagram of a function generator. [5]
- (c) Describe the principle of operation of a digital multimeter with neat diagram. [7]

III/SEM/E & TC/2014(W)(NEW)

(Code - ETT - 303)

Full Marks : 70

Time : 3 Hours

Answer any five questions.

Figures in the right-hand margin indicate marks.

1. (a) Define Resolution and Sensitivity of Digital meters. [2]
- (b) Explain the principle of operation of Ramp type digital voltmeter. [5]
- (c) Explain the operation of digital storage oscilloscope. [7]
2. (a) Define errors of an instrument and explain its types. [2]
- (b) Explain the measurement of self-inductance by Maxwell's Bridge. [5]
- (c) Discuss the operation of series and shunt type ohm-meter. [7]
3. (a) What is the advantage of using a make before break type switch in a multirange ammeter circuit? [2]
- (b) Discuss about the working principle of Q-meter. [5]
- (c) Explain the principle of operation of Digital Tachometer. [7]
4. (a) What are the advantages of permanent magnetic moving coil movement? [2]
- (b) Explain the measurement of self-inductance by Hay's Bridge. [5]
- (c) Explain about the use of Lissajous method for phase and frequency measurement in CRO. [7]
5. (a) What are the applications of oscilloscope? [2]
- (b) Explain the working principle of capacitive transducers. [5]
- (c) Explain the measurement of frequency and working principle of Wien bridge. [7]
6. (a) What do you mean by Accuracy and Precision? [2]
- (b) Explain the working principle of LVDT. [5]
- (c) Draw the block diagram and explain the working principle of simple CRO. [7]
7. (a) What are the advantages of Electrical Transducer? [2]
- (b) Discuss about the essential components of a A.C. Bridge. [5]
- (c) Explain the working principle with proper diagram of a function generator. [7]

III/SEM/ETC/2013(W)(NEW)

(Code - ETT - 303)

Full Marks - 80

Time : 3 Hours

Answer any five questions

The figures in the right-hand margin indicate marks.

1. (a) What are the errors of an instrument? [2]
- (b) Explain the principle of Digital frequency metre. [6]
- (c) Draw and explain Hay's bridge. Derive the equation for bridge balance expression for unknown parameter including Q-factor. [8]
2. (a) Why zero adjustment is necessary in a multimeter? [2]
- (b) Explain how dc and ac voltages can be measured with a CRO. [6]
- (c) Explain the working of optical pyrometer. [8]
3. (a) What do you mean by display of $4\frac{1}{2}$ digital multimeter? [2]
- (b) Explain the basic principle of a Q-meter. [6]
- (c) Explain the working principle of a function generator with a block diagram. [8]
4. (a) Define sensitivity. [2]
- (b) Explain the principle of series type ohm-meter. [6]
- (c) Describe the working principle of Ramp Type Digital voltmeter with help of block diagram and timing diagram. [8]
5. (a) What is series ohm-meter and shunt ohm-meter? [2]
- (b) Explain the principle of operation and working of digital tachometer. [6]
- (c) With block diagram explain the working of a digital storage oscilloscope. [8]
6. (a) Define the Resolution of digital meters. [2]
- (b) Explain the function of Dual Trace Oscilloscope with block diagram. [6]
- (c) Explain the measurement of frequency and working of Wien Bridge. [8]
7. (a) What is a time base signal? [2]
- (b) Describe the principle of working of LCR Bridge. [6]
- (c) With diagram explain the working of LVDT. [8]

III/SEM/ETC/2012(W)(NEW)

(Code - ETT - 303)

Full Marks – 80

Time : 3 Hours

Answer any *five* questions.

Figures in the right hand margin indicate marks.

1. (a) Write the differences occurs in an instrument. [2]
- (b) Explain the operation of a ohm-meter with neat diagram. [6]
- (c) Describe the principle of operation of an multirange ammeter with diagram and write its application. [8]
2. (a) What do you understand by display of $4\frac{1}{2}$ digital multimeter? [2]
- (b) Explain the principle of operation and working of digital tachometer. [4]
- (c) Describe the principle of operation and working of digital measurement of time with suitable diagram. [8]
3. (a) What do you mean by dual-trace oscilloscope? [2]
- (b) Discuss the block diagram of a CRO. [6]
- (c) With neat diagram explain the use of Lissajous figures of phase and frequency measurement. [8]
4. (a) State the application of Q-meter. [2]
- (b) Discuss the principle of working of LCR bridge with neat diagram. [6]
- (c) Explain the measurement of capacitance by Schering's bridge with necessary diagram and give its advantages. [8]
5. (a) What are the different parameters of an Electrical Transducer? [2]
- (b) Define strain gauge and explain the working of a strain gauge. [6]
- (c) Write the names of temperature transducer. Explain the working of optical pyrometer with diagram. [8]
6. (a) What do you mean by resistive transducer. [2]
- (b) Explain the measurement of frequency and working of Wein-bridge. [6]
- (c) Describe the working of LVDT with suitable diagram. [8]
7. (a) Why shunt resistor is used in Ammeter. [2]
- (b) Discuss the working of digital frequency meter. [6]
- (c) Explain the principle of working a function generator with neat diagram. [8]

III/SEM/ETC/2011(W)(NEW)

(Code - ETT - 303)

Full Marks – 80

Time : 3 Hours

Answer any *five* questions.

Figures in the right hand margin indicate marks.

1. Answer all question : [2 × 10]
 - (a) Define Lissajous' figure.
 - (b) What do you mean by zero setting in ohm meter and why it is required?
 - (c) List the salient features of LVDT.
 - (d) What is a thermocouple?
 - (e) Which type of scale is used in moving coil meter and why?
 - (f) What do you mean by accuracy of a multimeter?
 - (g) What is the difference between AC bridge and DC bridge?
 - (h) What is the difference between CRO and CRT?
 - (i) What are the errors of an instrument?
 - (j) How the size of banded strain gauge affects the accuracy of measurement?
2. Answer any six questions [5 × 6]
 - (a) Explain the working principle of LVDT with a neat diagram.
 - (b) Explain working of a Hay's bridge for measurement of unknown inductance with neat circuit diagram.
 - (c) Explain the principle of Q meter and describe the working of a basic Q meter circuit.
 - (d) With neat sketch diagram explain the principle and working of a capacitive pressure transducer.
 - (e) Draw and explain the principle of working of a function generator with a block diagram.
 - (f) Write short notes on dual trace oscilloscope.
 - (g) With a neat sketch explain the construction of a CRT.
 - (h) What is electrical transducer? Discuss the method of selecting a transducer.
 - (i) What is a load cell? Explain its working.
3. (a) Explain the working of a proximity sensors. [5]
- (b) Explain the working of current transducer. [5]
4. With neat sketch explain and construction and working of a PMMC instrument. Write down its advantages and disadvantages. [10]
5. Explain the principle of operation and working of a Digital Tachometer. [10]
6. Define the resolution and sensitivity of a digital meter. Explain the principle of operation and working of a digital multimeter. [10]
7. Write short notes (any two) [5 × 2]
 - (a) AC and DC voltage measurement by CRO
 - (b) Optical pyrometer.
 - (c) Frequency measurement by Wein bridge.

III-SEM/ETC/2010 (W)

(THEORY - 4)

Full Marks : 80

Time : 3 hours

Answer five questions including Q. No. 1 & 2

Figures in the right margin Indicate marks.

GROUP - A

1. Answer all questions :

[2 x 10

- (a) Define Lissajous figure.
- (b) What do you mean by second order instrument ?
- (c) Define gauge factor of a strain gauge.
- (d) Define accuracy of a meter.
- (e) What is a thermistor ?
- (f) What is the time base signal in CRO ?
- (g) Justify the name LVDT.
- (h) What are the advantages of PMMC instruments ?
- (i) Name any two detectors used in A.C. Bridge.
- (j) Why zero adjustment is necessary in a multimeter ?

GROUP - B

2. Answer any six questions :

[5 x 6

- (a) Explain how unknown A.C. Voltage and current can be measured with the help a CRO.
- (b) Explain the basic principle of Q-meter.
- (c) Describe construction and working principle of Hay's bridge.
- (d) Draw and explain the basic block diagram of a signal generator.
- (e) Derive torque equation of PMMC instrument.
- (f) Explain the principle of a Series type of ohm meter.
- (g) With neat sketch explain the principle and working of captive pressure transducer.
- (h) Define the following dynamic characteristics of instruments :
 - (i) Speed of response.
 - (ii) Fidelity.
 - (iii) Time lag.

GROUP - C

Answer any three questions :

[3 x 10

3. State how unknown signal frequency and phase angle can be measured by CRO.
4. Draw the block diagram of Ramp type digital voltmeter and explain its working.
5. Explain working principle of LVDT with neat circuit diagram and explain its different characteristics.
6. What is pyrometry ? With a neat sketch explain the working of a optical pyrometer.
7. Write short Notes on :
 - (i) Digital frequency meter.
 - (ii) Frequency measurement by Wien Bridge
 - (iii) Dual trace oscilloscope.

III-SEM/ETC/2009 (W)

(THEORY - 4)

Full Marks : 80

Time: 3hours

Answer five questions including Q No. 1 & 2

Figures in the right margin indicate marks.

GROUP - A

1. Answer all questions :

[2 x 10

- (a) Define active and passive transducer.
- (b) What is rigging in CRO ?
- (c) What is the application of photoemissive cell ?
- (d) What is dual trace oscilloscope ?
- (e) What is instrumentation amplifier and where it is used ?
- (f) Write down the names of four instruments that are used for measurement pressure.
- (g) What do you mean by dynamic response of zero order instruments ?
- (h) Write down at least three advantages of semiconductor strain gauge.
- (i) Name at least three advantage of load cells.
- (j) What is LVDT ?

GROUP - B

2. Answer any six questions :

[5 x 6

- (a) What are the advantages and disadvantages of Electric Transducers ?
- (b) Why platinum resistance thermometer is the best choice for measurement of temperature in industry ?
- (c) Discuss the advantages and disadvantages of induction type wattmeter.
- (d) Briefly discuss about the dynamic response of first order instruments.
- (e) Discuss the constructional feature of an optical pyrometer.
- (f) Briefly discuss about thermistor.
- (g) Discuss briefly about rotating Torque meter.

GROUP - C

Answer any three questions :

[3 x 10

3. Describe the working principle of a capacitive transducer with a neat diagram.
4. Derive the torque equation of a PMMC instruments.
5. Briefly discuss the block diagram of a general purpose CRO.
6. Write short Notes on :
 - (i) Bourdon tube
 - (ii) Static characteristic of an instrument.
7. Explain different types of strain gauge.

III-SEM/ETC/2008 (W)

(THEORY - 4)

Full Marks : 80

Time: 3hours

Answer five questions including Q. No. 1 & 2
Figures in the right margin indicate marks.

GROUP - A

- 1. Answer all questions :** [2 x 10]
- Name any two second order instruments ?
 - Name the variation sensed and the parameter affected in a photo-conductive cell.
 - What should be the frequency of operation in LVDT in order to have large o/p.
 - Which type of damping is used in moving iron instruments.
 - Can you use moving coil instrument for measuring ac.? if not why ?
 - How the size of a bonded strain Gauge affects the accuracy of measurement ?
 - What is instrument Amplifier ?
 - Under what condition a stationary pattern is obtained in CRO ?
 - Where do we apply a time base signal CRO ?
 - Give the temp. range of Iron Constantan thermo couple ?

GROUP - B

- 2. Answer any six questions :** [5 x 6]
- Explain with necessary derivation the dynamic response of a first order system ?
 - Explain the working principle of photoemissive cell ?
 - What is a load cell ? Explain its working ?
 - Derive the torque equation of a PMMC type motor ?
 - Explain different types strain gauges ?
 - Explain the working of a time base generator ?
 - What are the different types of electron emissions ? Explain each of them in brief ?

GROUP - C

- Answer any three questions :** [3 x 10]
- Explain the construction & working of Bourdon Tube ?
 - What necessary diagram, explain the operating principle of induction type watt meter ?
 - Write short Notes on :
 - Dynamic characteristics of instruments.
 - In-line rotating torque meter ?
 - Optical pyrometer ?

III-SEM/ETC/2007 (W)

(THEORY - 4)

Full Marks : 80

Time: 3hours

Answer five questions including Q. No. 1 & 2
Figures in the right margin indicate marks.

GROUP - A

- 1. Answer all :** 2x10
- What is speed of response ?
 - Define zero order system and write its equation.
 - What is thermistor ?
 - Can you use moving coil meters for measurement of AC ? why ?
 - Define gauge factor of strain gauge.
 - What is load cell ?
 - What do you understand by Pyrometry ?
 - Name two types of mechanical primary detectors used to convert applied force into displacement.
 - Define the sensitivity of CRO.
 - Why spring is required in measuring instruments?

GROUP - B

- 2. Answer any six:** 5x6
- Explain the principle of capacitive transducer with change in plate area.
 - Derive the torque equation of a PMMC instrument.
 - Draw the block diagram of CRO and explain each block.
 - Explain the working of Radiation Pyrometer.
 - Describe the working principle of LVDT and state its use.
 - Explain the terms accuracy, reproducibility and drift.
 - State principle of photoemissive, photoconductive and photovoltaic cells.
 - Explain the basic principle of In-line Rotating Torque sensor in brief.

GROUP - C

- Answer any three questions :** [3 x 10]
- Explain working principle, advantages, and disadvantages of any one type of wattmeter with necessary diagrams.
 - Describe the construction and working of platinum resistance thermometer.
 - Explain with neat sketch how pressure is measured by strain gauge type pressure gauge ?
 - What is digital storage oscilloscope and how it is differ from dual trace oscilloscope ?
 - Write short notes on any two :
 - Semiconductor strain gauge.
 - Dynamic characteristics.
 - Instrumentation amplifier.

III-SEM/ETC/2006 (W)

(THEORY - 4)

Full Marks : 80

Time: 3 hours

Answer any five questions including Q. No.1 and 2
Figures in the right-hand margin indicate marks :

GROUP - A

1. Answer all questions: 2 × 10
- (i) Why LVDT is used ?
 - (ii) Write the name of two elastic type
 - (iii) Write the mathematical expression only for gauge factor of a semiconductor strain gauge.
 - (iv) Name the advantages of load cell.
 - (v) Define piezo-electric effect.
 - (vi) Name the instruments used for measure alternating current.
 - (vii) Why triggering is used in CRO ?
 - (viii) Name the different types of focusing systems used in CRO.
 - (ix) Define reproducibility.

GROUP - B

2. Answer any five questions : 6×5
- (a) Explain the dynamic response of 2nd order instrument.
 - (b) Define transducer. Give the different classification of transducers.
 - (c) Derive the expression for deflecting torque of a PMMC instrument.
 - (d) Explain different types of errors of dynamometer type wattmeter and give its advantages and disadvantages.
 - (e) Explain the principle of bonding techniques of strain gauge and define Rostles strain gauge.
 - (f) Define time base and explain the working principle of time base generator.
 - (g) Explain the working principle of thermistor and derive its characteristics.

GROUP - C

- Answer any three questions : [3 x 10
3. Explain the working principle of a pneumatic pressure meter with neat sketch and write its advantages.
 4. Explain concept of deflection, derive expression for deflection sensitivity of electrostatic deflection.
 5. Explain the working principle of LVDT with a neat circuit diagram and explain its different characteristics.
 6. Explain the neat sketch the function of moving iron attraction and repulsion type instruments.
 7. Write short notes on any two :
 - (i) Photovoltaic cells
 - (ii) Instrumentation amplifier
 - (iii) Digital storage oscilloscope.

ANSWER - 2006 (W)

III-SEM/ETC/2005 (W)

(THEORY - 4)

Full Marks : 80

Time: 3 hours

Answer any five questions including Q. No. 1 and 2
Figures in the right-hand margin indicate marks :

GROUP - A

1. Answer all questions : 3 × 10
- (a) Define dead zone.
 - (b) Name any two elastic pressure sensors.
 - (c) What is thermistor ?
 - (d) What are the advantages of PMMC instruments?
 - (e) Give the temperature range of platinum resistance thermometer.
 - (f) What is load cell ?
 - (g) Name different types of strain gauges.
 - (h) What is time base signal in CRO ?
 - (i) Define gauge factor.
 - (j) Give two applications of CRO.

GROUP - B

2. Answer any six : 5 × 6
- (a) Define the following dynamic characteristics of instruments. (i) Speed of response (ii) Fidelity (iii) Time lag.
 - (b) Explain the principle of capacitive transducer with change in plate area.
 - (c) Derive the torque equation of a PMMC instrument.
 - (d) Explain the working principle of in-line rotating torque meter.
 - (e) Draw the block diagram of a temperature measurement system.
 - (f) Differentiate between bonded and unbonded strain gauges :
 - (g) Draw the block diagram of CRO.
 - (h) Explain the working of time base generator in CRO.

GROUP - C

- Answer any three : 3×10
3. Explain with neat sketches, the operation of LVDT.
 4. Explain the operating principle of Dynamometer type wattmeter. 10
 5. Describe the construction and working of platinum resistance thermometer. 10
 6. Derive an expression for the deflection sensitivity of electrostatic deflection in CRO. 10
 7. Write short notes on any two 5×2
 - (a) Optical pyrometer
 - (b) Photoelectric transducer
 - (c) Capacitive pressure gauge
 - (d) Dual trace oscilloscope



III-SEM/ETC/2004 (W)

(THEORY - 4)

Full Marks : 80

Time: 3hours

Answer any five questions including Q. No. 1 and 2

Figures in the right-hand margin indicate mark :

GROUP - A

- 1. Answer all questions:** 2×10
- (a) Name the different types of electron emission.
 - (b) Normally unknown signals are applied to which pair of plates in a CRO. What type of voltage is applied to the other pair of deflecting plates ?
 - (c) What are the parts of an electron gun in a CRT ?
 - (d) Why spring is required in meters ?
 - (e) Can you use moving coil meters for measurement of a.c. ? Why ?

- (f) Define gauge factor.
- (g) What do you mean by meter sensitivity?
- (h) Define accuracy of meter.
- (i) What are the parameters that can be measured with a CRO ? Can you measure non-electrical quantities ?
- (j) What is a therm couple ?

GROUP - B

- 2. Answer any five questions ?** 2×10
- (a) What are the advantages, disadvantages of a load cell ?
 - (b) Explain the basic principle of In-line Rotating - Torque sensor in brief.
 - (c) Explain the basic principle of capacitive pressure transducer.
 - (d) Write a short note on Radiation Pyrometer.
 - (e) Briefly describe the focussing arrangement in a CRO.
 - (f) Explain the basic principle of a digital storage oscilloscope.

GROUP - C

- Answer any three** 3×10
- 3. Describe the principle of operation of LVDT with necessary diagrams. 10
 - 4. Draw the block diagram of a C.R.O. and explain its working. 10
 - 5. Explain the construction and working of a PMMC Instrument. 10
 - 6. Explain working principle, advantages, and disadvantages of any one type of wattmeter with necessary diagrams.





CHAPTERWISE IMPORTANT QUESTIONS

CHAPTER -1

Answer the following questions:

[2 marks]

1. What are the errors of an instrument?
2. Define sensitivity.
3. Define accuracy.
4. Name any two second order instrument.
5. What is speed of response?
6. Define precision.
7. What is repeatability?
8. What is reproducibility?
9. Define resolution of an instrument.
10. What is true value?
11. What is systematic error and name its types?
12. How the environmental error can be avoided?
13. How the instrumental error can be avoided?
14. What is dynamic error?
15. Define lag.
16. Define fidelity.
17. What is static error?

Answer the following questions:

[5 marks]

1. Define the following dynamic characteristics of instruments: (I) Speed of response. (II) Fidelity (III) Lag
2. Define the following static characteristics of instruments: - (I) Resolution (II) Precision (III) Sensitivity
3. Define the following static characteristics of instruments : - (I) Repeatability (II) Accuracy (III) Reproducibility

Answer the following questions:

[7 marks]

1. Describe the static characteristics of an instrument?

CHAPTER -2

Answer the following questions:

[2 marks]

1. Why zero adjustment is necessary in a Multimeter?
2. What are the advantages of PMMC instrument?
3. Can you use moving coil meters measurement of AC? Why?

Answer the following questions:

[5 marks]

1. Explain the principle of Series type of Ohmmeter?
2. Derive the torque equation of PMMC Instrument?
3. Explain the principle of Shunt type of Ohmmeter?

Answer the following questions:

[7 marks]

1. Describe the principle of operation of an dc ammeter and Multirange ammeter with diagram?
2. Describe the series type and shunt type of ohmmeter with diagram?

CHAPTER -3

Answer the following questions:

[2 marks]

1. What do you mean by display of $4\frac{1}{2}$ digital multimeter?
2. What is $3\frac{1}{2}$ digital multimeter?
3. Define resolution of digital meters
4. What is sensitivity of digital meters?
5. Write down the advantage of digital multimeter over analog multimeter.
6. What is the principle of ramp type digital voltmeter?
7. State the principle of digital measurement of time.

Answer the following questions:

[5 marks]

1. Explain the principle of Digital Frequency Meter?
2. Explain the principle of operation and working of Digital Tachometer?
3. Describe the operation of Digital Multimeter?
4. Explain the time base of selector for digital measurement of time?

Answer the following questions:

[7 marks]

1. Describe the working principle of Ramp Type Digital Voltmeter with the help of block diagram?
2. Describe the principle of operation and the block diagram of Digital Frequency Meter?
3. Explain the Digital measurement of Time with suitable diagram?
4. Define resolution and sensitivity of a digital meter. Explain the principle of operation & working of Digital Multimeter?
5. Write short notes on (I) Digital tachometer (II) Digital Multimeter



CHAPTER -4

Answer the following questions:

[2 marks]

1. What do you mean by dual trace Oscilloscope?
2. Define Lissajous figure.
3. Write down the applications of Oscilloscope?
4. How the voltage is measured in Oscilloscope?
5. How the time period and frequency is measured in Oscilloscope?
6. What is triggering in CRO?
7. Why triggering is needed in CRO?
8. At what condition ellipse will appear at the CRO?
9. When the two sinusoidal voltage of equal frequency and in phase with each other which pattern will appear in the screen of CRO?
10. At what condition straight line will appear on the screen of CRO?
11. What is the time base signal in CRO?

Answer the following questions:

[5 marks]

1. Explain the function of Dual trace Oscilloscope with block diagram?
2. Discuss the block diagram of a CRO?
3. What is Lissajous figure of phase measurement?
4. What is lissajous figure? Explain the use of lissajous figure of frequency measurement?

Answer the following questions:

[7 marks]

1. With block diagram explain the working of digital storage Oscilloscope?
2. With neat diagram explain the use of lissajous figure of phase and frequency Measurement?
3. Explain the function of Dual Trace Oscilloscope with neat block diagram and write down specification of it?
4. Briefly discuss block diagram of a general purpose of CRO?
5. Describe the function of Simple CRO with block diagram?

CHAPTER -5

Answer the following questions:

[2 marks]

1. Name the detectors used in Bridge?
2. State the two condition of bridge balance in polar form?
3. How can we know that the bridge in balance state?
4. Which bridge is used for the measurement of resistance?
5. What are the bridges used for the measurement of inductance?
6. What are the bridges used for the measurement of capacitance?
7. Which bridge is used for the measurement of frequency?
8. What is the difference between Maxwell and Hay Bridge?
9. What is the Q-Factor?
10. Define dissipation factor?

Answer the following questions:

[5 marks]

1. Explain the basic principle of a Q meter?
2. Describe the Principle of working of LCR Bridge?
3. Describe the general expression for bridge balance?
4. Derive the general expression of Wheatstone Bridge?
5. Explain the measurement of Inductance using Maxwell Bridge?

Answer the following questions:

[7 marks]

1. Draw and explain Hay's bridge and derive the equation for bridge balance expression for unknown parameter including Q-meter?
2. Explain the measurement of frequency and working of Wien Bridge?
3. Explain the measurement of capacitance by searching bridge with a neat diagram?
4. Derive the general expression of Wheatstone bridge in balance and unbalance state?
5. Explain the Q-meter with suitable diagram?





CHAPTER -6

Answer the following questions:

[2 marks]

1. What are the different parameters of an Electrical Transducer?
2. What do you mean by resistive transducer?
3. What is thermo couple?
4. What is Thermistor?
5. Justify the name LVDT?
6. Write down the advantages of LVDT?
7. What is Load cell?
8. What do you understand by Pyrometry?
9. Name two Temperature Sensors?
10. Write down the advantages of electrical transducer?
11. What is Strain gauge?
12. What is RTD?
13. What are the Parameters required for the selection of transducer?
14. What is transducer?

Answer the following questions:

[5 marks]

1. What is electrical transducer? Discuss the method of selecting a Transducer?
2. What is a load cell? Explain its working.
3. Briefly discuss about Thermistor?
4. Explain the Principle of captive Transducer with the change in plate area?
5. Explain the working principle of Thermistor?
6. Explain the working principle of RTD?
7. Briefly describe about resistive Transducer?
8. Explain briefly about strain gauge?

Answer the following questions:

[7 marks]

1. Explain the construction and working of Optical Pyrometer?
2. Explain the construction and working of LVDT?
3. Describe the construction and working of Thermocouple?
4. Write a short notes on (I) Load cell (II) Resistive transducer
5. Write a short notes on (I) Thermistor (II) RTD

CHAPTER -7

Answer the following questions:

[2 marks]

1. Define wave analyzer.
2. Name the types of wave analyzer.

Answer the following questions:

[5 marks]

1. Explain the working principle of a AF sine and square wave generator?

Answer the following questions:

[7 marks]

1. Explain the working principle of a Function Generator with a block diagram?

