

Reg. No. :

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**Question Paper Code : 80133**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Electrical and Electronics Engineering

EE 8403 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate Accuracy and Precision.
2. Distinguish between Gravity control and Spring control.
3. Specify the use of copper shading bands. Where is it placed in the energymeter?
4. How the flux density is measured?
5. How Maxwell's bridge differ from Anderson bridge, although both are used for measuring inductance?
6. Specify the purpose of Wagner earthing device.
7. Mention the use of Lissajous patterns.
8. Specify the application of data loggers.
9. Mention the electrical phenomena used in transducers.
10. List the elements of DAQ system.

PART B — (5 × 13 = 65 marks)

11. (a) Explicate the static and dynamic characteristics of an instrumentation system.

Or

- (b) Elaborate the working of Moving iron instrument and derive the torque equation of the Moving iron instrument.

12. (a) State Blondel's theorem and explain how the power measurement using two wattmeter method.

Or

- (b) Describe the step by process involved in determination of B-H curve and hysteresis loop.

13. (a) Derive the expressions for measurement of unknown capacitance with a neat bridge circuit.

Or

- (b) Derive the expressions for measurement of unknown inductance using Hays bridge.

14. (a) Explain in detail about the various types of Recorders.

Or

- (b) Explain in detail about the LED and LCD displays.

15. (a) Elaborate the types of resistive and inductive transducers used for measuring pressure.

Or

- (b) Elucidate the elements of data acquisition system.

PART C — (1 × 15 = 15 marks)

16. (a) A sinusoidal alternating voltage of amplitude, 100-V is applied across a circuit containing a rectifying device which entirely prevents current from flowing in one direction and offers a non-inductive resistance of 10 ohm to the flow of current in the other direction. Find the reading on (i) a hot wire, (ii) a moving coil ammeter in the circuit.

Or

- (b) A Maxwell's capacitance bridge shown in Fig. 1 is used to measure an unknown inductance in comparison with capacitance. The various values at balance :  $R_2 = 400 \text{ ohm}$ ;  $R_3 = 600 \text{ ohm}$ ;  $R_4 = 1000 \text{ ohm}$ ;  $C_4 = 0.5 \mu\text{F}$ .

Calculate the values of  $R_1$  and  $L_1$ . Calculate also the value of storage  $Q$  factor of the coil if frequency is  $1000 \text{ Hz}$ .

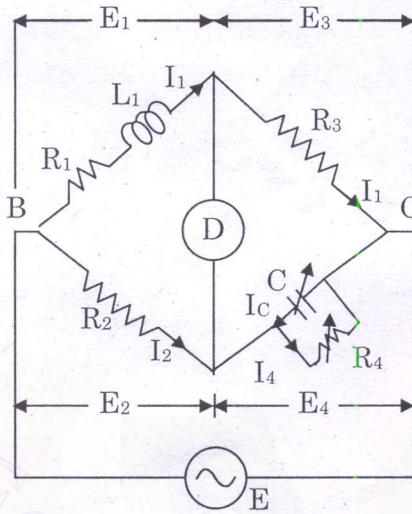


Fig. 1

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**Question Paper Code : 51431**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/080280016/10133 EE 302 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 – Measurements and Instrumentation for B.E. (Part-Time)  
Third Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define measuring lag and fidelity of dynamic characteristics of instrument. P. NO : 8
2. Give the international standards of instruments. P. NO : 8
3. How are basic instruments converted into higher range ammeter? P. NO : 18
4. Define creeping in energy meter. P. NO : 18
5. With a neat circuit diagram, write the balanced equation of Wheatstone bridge. P
6. Draw the circuit diagram write the expression for unknown inductance and its resistance of Anderson's bridge.
7. What is LED? P. NO : 44
8. What is the principle of working of Dot Matrix display?
9. Define primary type of transducer.
10. What is the principle of operation of optical transducer?

## PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the functional elements of an instrument with a neat block diagram. P. NO: 9 (10)
- (ii) Define accuracy and reproducibility of an instrument and explain. P. NO: 10 (6)
- Or
- (b) (i) What are the different types of errors? Explain how to eliminate errors in instrument. P. NO: 14 (10)
- (ii) Describe primary and secondary standards in instruments. P. N (6)
12. (a) With circuit and phasor diagram, explain the working of single phase ac energy meter. P. NO: 24 (16)
- Or
- (b) (i) Obtain B-H curve of a ring specimen. P. NO: 21 (8)
- (ii) Describe how to obtain iron loss of a ring specimen using wattmeter. P. NO: 21 (8)
13. (a) With a circuit diagram, explain the principle of operation of Duo-range DC Potentiometer. P. NO: 37 (16)
- Or
- (b) (i) Draw a neat diagram of Kelvin double bridge and explain how to measure low resistance. (8)
- (ii) Obtain an expression for measurement of inductance using Maxwell's Inductance Bridge with a neat circuit diagram. P. NO: 34 (8)
14. (a) (i) Describe construction and working of magnetic tape Recorder. P. NO: 55 (8)
- (ii) With a block diagram, explain the working of digital CRO. P. NO: 49 (8)
- Or
- (b) (i) Draw a neat block diagram of X-Y recorder and describe its working. P. NO: 51 (8)
- (ii) Explain the principle and working of CRT display with a neat diagram. P. NO: 45 (8)
15. (a) (i) Describe the construction and working of potentiometer type resistance transducer for measuring linear displacement. (8)
- (ii) Explain the working of D/A converter with a neat diagram. (8)
- Or
- (b) (i) What is called Piezo electric transducer? Explain its working with a diagram. P. NO: 68 (8)
- (ii) Explain how to measure pressure using capacitive type transducer. (8)

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**Question Paper Code : 31391**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/10133 EE 302/080280016 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 — Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering — Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

Define the terms precision and sensitivity.

What is the significance of calibration? P. NO: 8

Write any four types of analog ammeter used for instrumentation.

What are the different methods used for frequency measurement in power frequency range?

What are the applications of potentiometers? P. NO: 32

What are the sources of Electromagnetic interference?

Distinguish between LED and LCD. P. NO: 44

What are the functions of data logger? P. NO: 44

What are the factors to be considered for selection of transducers? P. NO: 59

Mention any four types of Analog to Digital converter? P. NO: 72

## PART B — (5 × 16 = 80 marks)

11. (a) Describe the functional elements of an instrument with a block diagram and draw the static and dynamic characteristics. P. No: 9 (16)

Or

- (b) A circuit was tuned for resonance by eight different students and the values of resonant frequency in KHz were recorded as 532, 548, 543, 535, 546, 531, 543 and 536. Calculate  
 (i) Arithmetic mean.  
 (ii) Deviation.  
 (iii) Average deviation.  
 (iv) Standard deviation. P. No: 14 (16)

12. (a) Describe the construction and working of permanent magnet moving coil instrument. Also derive the expression for deflection. (16)

Or

- (b) Write short notes on :  
 (i) Current transformer. (8)  
 (ii) Weston frequency meter. P. No: 25 (8)

13. (a) Explain how the inductance is measured in terms of known capacitance using Maxwell's bridge. Derive the conditions for balance. P. No: 34 (16)

Or

- (b) Explain the following :  
 (i) Grounding techniques. P. No: 40 (8)  
 (ii) Causes of electromagnetic interferences in measurements. P. No: 36 (8)

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorder. P. No: 55 (16)

Or

- (b) With the help of the functional block diagram, explain the working principle of digital storage oscilloscope, mention its advantages over analog CRO? (16)

15. (a) Explain the construction and working principle of linear variable differential transformer (LVDT). P. No: 64 (16)

Or

- (b) (i) What is data acquisition system? With generalized block diagram, explain the functions of it. P. No: 65 (10)  
 (ii) Write short notes on smart sensors. P. No: 69 (6)

Reg. No. :

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**Question Paper Code : 21391**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/10133 EE 302/080280016 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 — Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering — Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

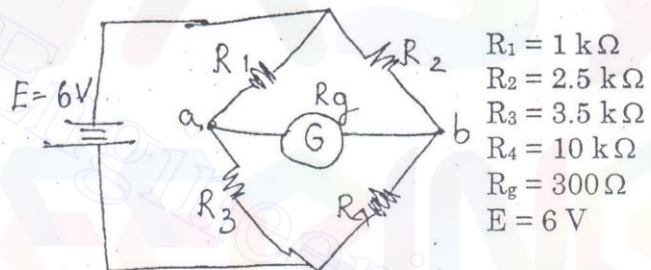
PART A — (10 × 2 = 20 marks)

1. The expected value of the voltage across a resistor is 40V. However the measurement gives a value of 39V. Calculate the absolute error. P. NO : 8
2. What are the various important functional elements of a typical measurement system? P. NO : 9
3. Draw the circuit of a basic DC voltmeter. P. NO : 18
4. Discuss in brief about the hysteresis in B-H curve. P. NO : 18
5. How does a Hay's bridge differ from Maxwell's bridge? What is its uniqueness? P. NO : 33
6. Which instrument is used for measuring very high resistances found in cable insulations? P. NO : 33
7. What are the various components of a recording instrument? P. NO : 44
8. Reason out why today's commercial LED monitor have become more popular than their LCD counterparts. P. NO : 44
9. What is known as thermocouple effect and how do you use it in a transducer? P. NO : 5
10. When do you call an instrument to be intelligent? P. NO : 59



## PART B — (5 × 16 = 80 marks)

11. (a) Summarise the static and dynamic characteristics of instruments. P. NO: 10, 13  
Or
- (b) (i) How is the statistical analysis of measurement data performed? P. NO: 16  
(ii) For the given data calculate any three statistically analysed values  
 $x_1 = 49.7$ ;  $x_2 = 50.1$ ;  $x_3 = 50.2$ ;  $x_4 = 49.6$ ;  $x_5 = 49.7$ .
12. (a) (i) What are the main considerations in selecting a voltmeter. (8)  
(ii) With a neat block diagram of a digital multimeter explain their working principle. P. NO: 32 (8)  
Or
- (b) On what principle a digital frequency meter works? Explain with neat diagrams.
13. (a) An unbalanced wheatstone bridge is given below in Fig. 13 (a). Calculate the current through the galvanometer.



- Or
- (b) (i) Give the construction of a Anderson's bridge and derive its balance conditions. (10)  
(ii) Write a detailed technical note on grounding techniques. P. NO: 40 (6)
14. (a) What is the advantage of using a magnetic tape recorder? Explain how the tape recorder works with suitable diagrams. P. NO: 55 (16)  
Or
- (b) Bring out how data loggers measure and record data effortlessly, accurately and quickly explaining the working of them. P. NO: 52 (16)
15. (a) Explain the classification of transducers and discuss about the selection criteria for them. P. NO: 60  
Or
- (b) Explain the following :
- (i) Piezoelectric transducers P. NO: 68  
(ii) Smart sensors. P. NO: 69

Reg. No. :

**Question Paper Code : 11359**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Third Semester

Electrical and Electronics Engineering

EE 2201/131301/EE 33/EI 1202/10133 EE 302/080280016 — MEASUREMENTS  
AND INSTRUMENTATION

(Regulation 2008)

(Common to PTEE 2201 — Measurements and Instrumentation for  
B.E. (Part-Time) Third Semester Electrical and Electronics  
Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term 'Sensitivity' of an instrument.
2. The true value of a voltage is 100 V. The values indicated by a measuring instrument are 104, 103, 105, 103 and 105 Volts. Find the accuracy and precision of the measurement.
3. A (0 – 25) A ammeter has a guaranteed accuracy of 1 percent of full scale reading. The current measured by this instrument is 10 A. Determine the limiting error in percentage.
4. Explain with example, the term 'Hysteresis'. *P. NO : 18*
5. Write the necessary balance conditions for a Schering bridge. *P. NO : 32*
6. Why there are two conditions of balance in AC bridges?
7. Brief up the working principle of a digital encoder.

8. What is the principle of operation of an ink-jet printer?
9. What is the difference between sensor and transducer?
10. Name some of the active transducers which are used in the measurement of temperature. P.No:60

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail, different static characteristics of a measurement system with examples. P.No:10 (16)

Or

- (b) (i) Describe the various modes of statistical evaluation of measurement data. P.No:16 (8)
- (ii) Discuss in detail, about calibration. P.No:11 (8)

12. (a) (i) Discuss the working principle of operation of Electrodynamometer type of instruments with its constructional diagram. P.No:27(8)
- (ii) A PMMC ammeter gives reading of 40 mA when connected across two opposite corners of a bridge rectifier, the other two corners of which are connected in series with a capacitor to 100 k, 50 Hz supply. Determine the capacitance. (8)

Or

- (b) (i) The coil of instrument has 42.5 turns. The mean width of the coil is 2.5 cm and the axial length of the coil is 2 cm. If the flux density is  $0.1 \text{ Wb/m}^2$ , calculate the torque on the moving coil in Nm. (6)
- (ii) A 100/5A current transformer having a rated burden of 25 VA has an iron loss of 0.4W and a magnetizing current of 2 A. Calculate its ratio error and phase angle error when supplying rated output current to a meter having a ratio of resistance to reactance 5. (10)

13. (a) (i) In a balanced network, AB is a resistance of  $500 \Omega$  in series with an inductor of 0.18 H, BC and DA are non-inductive resistances of  $1 \text{ k}\Omega$  each and CD consists of a resistance R in series with a capacitor C. A potential difference of 5 V at a frequency of  $5000/2\pi$  is applied between points A and C. Determine the values of R and C. (8)
- (ii) Draw and explain the balance conditions of a Wheatstone bridge. P.No:42 (8)

Or

- (b) (i) Explain the construction of Anderson's bridge. Derive the unknown quantities at balance condition. Also write its advantages and disadvantages. (10)
- (ii) Determine the insulation resistance of a short length of cable in which voltage falls from 125 to 100 V in 25 seconds. The capacity of the condenser is  $600 \times 10^{-12}$  F. (6)
14. (a) (i) Explain the working principle of magnetic tape recorders. (8)
- (ii) Compare and contrast the working, advantages and disadvantages of LED and LCD. P. NO: 57 (8)

Or

- (b) (i) Discuss the working of digital CRO. P. NO: 49 (8)
- (ii) Write a detailed technical note on dot matrix display. (8)
15. (a) (i) Explain the successive approximation type ADC with its characteristics. P. NO: 72 (8)
- (ii) A 5-plate transducer has plates of dimensions  $20\text{mm} \times 20\text{mm}$  and separated 0.25 mm apart. The arrangement is to be used for measuring displacement. Determine the sensitivity of the arrangement. Assume air medium. (8)

Or

- (b) (i) Describe the principle of operation of LVDT and its characteristics. P. NO: 64 (8)
- (ii) A linear resistance potentiometer is 50 mm long and is uniformly wound with a wire of total resistance 5 k $\Omega$ . Under normal conditions, the slider is at the centre of the potentiometer. Determine the linear displacement when the resistance of the potentiometer, as measured by the Wheatstone bridge, is 1850  $\Omega$ . If it is possible to measure a minimum value of 5  $\Omega$  resistance with the above arrangement, determine the resolution of the potentiometer in mm. (8)

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**Question Paper Code : 10315**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2012.

Third Semester

Electrical and Electronics Engineering

EE 2201/131301/EE 33/EI 1202/ 10133 EE 302/080280016 — MEASUREMENTS  
AND INSTRUMENTATION

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the static characteristics of an instrument? P. NO : 10
2. What is the significance of calibration? P. NO : 8
3. What is meant by creeping in energy meters? P. NO : 18
4. List out the methods used for measurement of iron loss in ferromagnetic materials.
5. What is the use of earth loop?
6. What is meant by self balancing bridges? Give two examples.
7. What is the difference between LED and LCD? P. NO : 44
8. What are the functions of a data logger? P. NO : 44
9. What are the factors to be considered for selection of transducer? P. NO : 50
10. Define smart sensors. P. NO : 69

## PART B — (5 × 16 = 80 marks)

11. (a) Show the functional blocks of a generalized instrumentation system through a neat sketch. Also explain their functions in detail. (16)  
P. No: 9  
Or
- (b) Describe the different types of static errors in a measurement system. (16)
12. (a) Describe the constructional details and working principle of the single phase induction type energy meter? (16)  
P. No: 14  
P. No: 24  
Or
- (b) Write short notes on :
- (i) Use of current transformer for current and power measurement. (8)
- (ii) Working of Weston frequency meter. (8)  
P. No: 25
13. (a) Explain how Wein bridge used for frequency measurement with neat circuit diagram. Also derive the suitable expression. (16)  
Or
- (b) (i) Discuss the effects of electro static and electromagnetic interference in instruments. (8)  
P. No: 36
- (ii) Write short notes on Grounding techniques. (8)  
P. No: 40
14. (a) Explain the principle of working of a X-Y recorder with neat functional diagram. Also mention some applications. (12 + 4)  
P. No: 51  
Or
- (b) With neat figure explain the working principle of a digital storage oscilloscope. What are the advantages over analog CRO? (12 + 4)
15. (a) Explain the principle of the following transducers.
- (i) Thermistors (8)  
P. No: 62
- (ii) LVDT (8)  
P. No: 64
- Or
- (b) What is data acquisition system? Give the block diagram arrangement of a data acquisition system and describe the function of each component. (16)  
P. No: 65

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B.E./B.TECH. DEGREE EXAMINATIONS, NOV/DEC-2011

REGULATIONS 2007

SIXTH SEMESTER

**EI 1361 – MEASUREMENTS AND INSTRUMENTATION**

ELECTRICAL AND ELECTRONICS ENGINEERING

Time: Three Hours

Maximum: 100 marks

ANSWER ALL QUESTIONS

PART-A (10×2=20 marks)

1. What is meant by accuracy of an instrument?
2. A set of independent current measurements were recorded as 10.03, 10.10, 10.11 and 10.08 A.  
Calculate  
(a) the average current  
(b) the range of error.
3. Show the connection of a current transformer with a neat diagram.
4. What is the special feature of a wattmeter that is suitable for low power factor circuits?
5. What are the applications of self balancing potentiometers?
6. A Maxwell bridge is having bridge constants at balance as  $C_1 = 0.01\mu\text{F}$ ,  $R_1 = 470\text{ K}\Omega$ ,  $R_2 = 5.1\text{ K}\Omega$  and  $R_3 = 100\text{ K}\Omega$ . Find the series equivalent of the unknown impedance.
7. What are the various methods of recording data?  
In what ways line printers are advantageous over dot matrix printers?

9. What are the factors to be considered for selecting a transducer? P.NO: 59
10. Why is an A/D converter usually considered as an encoder?

PART-B (5×16=80 marks)

11. (a) (i) What are the different standard inputs (8) for studying the dynamic response of a system? Define and sketch them. P.NO: 13
- (ii) Define and explain the types of possible (8) errors in an instrument. P.NO: 14

Or

- (b) (i) A circuit was tuned for resonance by eight (8) different students and the values of resonant frequency in KHz were recorded as 532, 548, 543, 535, 546, 531, 543 and 536. Calculate
- (a) The arithmetic mean
- (b) Deviations from mean
- (c) The average deviation
- (d) The standard deviation and
- (e) Variance. P.NO: 14
- (ii) What is a standard? Explain the different (8) types of standards. P.NO: 12



2. (a) (i) Describe with the help of diagrams the construction and working of a single phase energy meter. (8) P. NO: 24
- (ii) Describe the method for determination of B-H curve for ring specimen. (8) P. NO: 21

Or

- (b) (i) What are the various types of digital voltmeters? Explain the construction and working of any one type of DVM. (8) P. NO: 22
- (ii) Describe the construction and working of a Weston Frequency meter. (8) P. NO: 25
3. (a) (i) Explain in detail laboratory type DC potentiometer. (8) P. NO: 37
- (ii) Describe about the multiple earth and earth loops. (8) P. NO: 40

Or

- (b) (i) Describe with the help of circuit and vector diagrams, the Anderson bridge method for the measurement of inductance. (8)
- (ii) Explain the different techniques of grounding. (8) P. NO: 40
- (a) (i) With neat diagram explain the basic components and working principle of a Tape Recorder. (8) P. NO: 55

(ii) Explain with neat sketch (8)

- (a) Dot matrix displays
- (b) Bar graph displays

Or

(b) (i) Discuss in detail about LCD's P.No: 58 (8)

(ii) Explain the block diagram of oscilloscope with a neat sketch. P.No: 49 (8)

15. (a) (i) Discuss in detail the working of digital displacement transducers. (8)

(ii) With neat diagram explain any one type of D/A converter. P.No: 73 (8)

Or

(b) (i) Describe the construction and working of LVDT. Mention some applications of LVDT. P.No: 64 (8)

(ii) Explain in detail about piezoelectric transducer with neat diagram. P.No: 62 (8)

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<b>Question Paper Code : 57319</b>
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B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Electrical and Electronics Engineering

EE 6404 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Name the dynamic characteristics of measurement systems. P. NO: 8
2. What is meant by calibration of an instrument? P. NO: 8
3. Define creeping in energy meter? P. NO: 18
4. How are basic instruments converted into higher range ammeter? P. NO: 18
5. What is called a volt-ratio box?
6. What is meant by grounding? P. NO: 40
7. Mention the role of Data loggers in Instrumentation system. P. NO: 44
8. Distinguish between LED and LCD. P. NO: 44
9. What are the factors to be considered for selection of transducers? P. NO: 59
10. List the types of Analog to Digital Converter? P. NO: 72

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**PART - B (5 × 16 = 80 Marks)**

11. (a) (i) Explain the static characteristics of an instrument. *page No: 10*  
 (ii) Explain in detail the calibration technique. *Page No: 11*

**OR**

- (b) What are the different types of errors ? Explain how to eliminate errors in instruments. *page No: 14*

12. (a) With neat sketch, explain the construction and operation of repulsion type moving iron instrument. Give the advantages and limitations of such instruments. *Page No: 19*

**OR**

- (b) (i) Obtain B-H curve of ring specimen. *Page No: 21*  
 (ii) Describe how to obtain iron loss of a ring specimen *Page No: 21*

13. (a) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working principle. *Page No: 38*

**OR**

- (b) (i) Explain how the inductance is measured in terms of known capacitance using maxwell's bridge. Derive the conditions for balance. *Page No: 34*  
 (ii) Why Hay's bridge is suited for measurement of inductance of high Q coils. *Page No: 41*

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorders. *Page No: 55*

**OR**

- (b) Describe the construction and working of LCDs. Mention the difference between light scattering and field effect types of LCDs, also explain the advantages of LCDs. *Page No: 58*

15. (a) Explain in detail about construction and working of LVDT. *Page No: 64*

**OR**

- (b) Explain smart sensors with built in features. Compare with conventional sensors. *Page No: 69*

Reg. No. 

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**Question Paper Code : 27217**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electrical and Electronics Engineering

EE 6404 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define resolution and precision.
2. What is meant by calibration of an instrument? P. NO: 8
3. Define creeping in energy meter. P. NO: 18
4. State any two applications of CT and of PT.
5. List the various detectors used for AC bridges.
6. What is called a volt-ratio box?
7. What is the principal of operation of an ink-jet printer?
8. What are the functions of data logger? P. NO: 44
9. What is a transducer? Give an example. P. NO: 59
10. What is meant by resolution for Analog Digital Converter?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the functional elements of an instrument with a neat block diagram. P. NO: 9 (10)
- (ii) In a test, temperature is measured 100 times with variations in apparatus and procedures. After applying the corrections, the results are :

Temp <sup>o</sup> C	397	398	399	400	401	402	403	404	405
Frequency of occurrence	1	3	12	23	37	16	4	2	2

Calculate.

- (1) Arithmetic mean
- (2) Mean deviation
- (3) Standard deviation. *Pay NO : 14* (6)

Or

- (b) (i) Explain the static characteristics of an instrument. *Pay No : 10* (10)
- (ii) Explain in detail systematic error. *P. NO : 14* (6)

12. (a) With circuit and phasor diagram, explain the working of single phase ac energy meter. *P. NO 24*

Or

- (b) Write a short notes on :
  - (i) Current Transformer (8)
  - (ii) Weston frequency meter *P. No : 25* (8)

13. (a) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working principle. *P. NO : 38*

Or

- (b) Explain about
  - (i) Electrostatic and electromagnetic interference. *P. NO : 36*
  - (ii) Need for Grounding for measuring instruments. *P. NO : 40*

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorders. *P. NO : 55*

Or

- (b) With neat figure explain the working principle of a digital CRO. What are its advantages over analog CRO? *P NO : 49*

15. (a) Explain in detail about construction and working of LVDT. *P. NO 64*

Or

- (b) Explain successive approximation type ADC with its characteristics. *P. NO*

Reg. No. : 

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**Question Paper Code : 77134**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015

Fourth Semester

Electrical and Electronics Engineering

EE 6404 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Gross and random errors.
2. Illustrate the difference between accuracy and precision. P No: 8
3. State the purpose of shunts in the Voltmeter. P. No: 18
4. A basic D'Arsonval movement with a full deflection of  $50 \mu A$  and internal resistance of  $500 \Omega$  is used as voltmeter. Determine the value of the multiplier resistance needed to measure a voltage range of 0 – 10V.
5. What is a potentiometer? List its applications? P. No: 33
6. Mention the grounding techniques available in measurements. P. No: 40
7. What is the technique used in strip chart recorders?
8. Compare plotters and printers. P. No: 44
9. Write the desired properties of thermocouple metals.
10. What are the two ways, that the DAS are used to measure and record analog signals? P. No: 65

PART B — (5 × 16 = 80 marks)

11. (a) By using a micrometer screw, the following readings were taken of a certain length :  
1.34, 1.38, 1.56, 1.47, 1.42, 1.44, 1.53, 1.48, 1.40, 1.59 mm. Calculate the following :  
 (i) Arithmetic mean  
 (ii) Average deviation  
 (iii) Standard deviation and  
 (iv) Variance. P No: 14

(16)

Or

- (b) (i) Discuss the different types of standards of measurement. P.No: 18 (8)
- (ii) Describe the static and dynamic characteristics of measuring instruments. P No: 10, 13 (8)
12. (a) (i) Describe the basic magnetic measurement using B-H curve. (8)
- (ii) Explain the operating principle of instrument transformer. P No: 21 (8)
- Or P.No 20
- (b) (i) Explain the methods of turns compensation used in Current transformers to reduce ratio error. (8)
- (ii) Explain the term 'loading' in voltmeter and give the method to remove the adverse effect of the same. (8)
13. (a) Explain the procedure of measuring a low resistance with help of Kelvin's double bridge. Derive the relation to finding unknown resistance. (16)
- Or
- (b) Describe in detail about :
- (i) Interference and screening. P.No: 36 (8)
- (ii) Multiple earth and earth loops. P.No: 40 (8)
14. (a) (i) Explain the segmental display and dot matrices display for numeric and alpha numeric displays. (12)
- (ii) Write short notes on data logging. P.No: 52 (4)
- Or
- (b) (i) Draw and explain the Block diagram of digital CRO. P.No: 49 (12)
- (ii) Describe different types of sweeps used in CRO. (4)
15. (a) Write short notes on the following :
- (i) Seeback effect.
- (ii) Piezo electric transducer. P.No: 68
- (iii) Resistance thermometers. P (16)
- Or
- (b) (i) Explain the basic operation of A/D converter utilizing D/A Converter. (8)
- (ii) Explain the concept of Smart sensors. P.No: 69 (8)



Reg. No. :

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**Question Paper Code : 91434**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/080280016/10133 EE 302 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 – Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define limiting errors. Derive the expression for relative limiting error. P. No. 8.
2. Define linear time invariant and line time variant systems. Give examples.
3. Why PMMC ammeters are the most widely used instrument?
4. An absolute electrometer has a movable circular plate 10 cm in diameter. Determine the potential difference across the plates if the plates during measurement are 6 mm apart and the force of attraction is  $4 \times 10^{-3}$  N.
5. Draw the equivalent circuit and phasor diagram of a potential transformer.
6. Write the working principle of a digital plotter.
7. What is meant by grounding? P. NO : 40
8. What are the various detectors that are used in a bridge network?
9. What is transducer? What is the difference between sensor and transducer? P. NO. 59
10. What are the advantages of successive approximation type ADC?

## PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the block diagram and functional elements of measurement system with neat diagram. P. No: 9 (8)
- (ii) Classify and explain the different types of standards and errors of measurements. P. No: 12, 14 (8)

Or

- (b) (i) With a suitable illustration elaborate the significance of calibrations. P. No: 11 (8)
- (ii) Write a technical note on static and dynamic characteristics of instrumentation systems. P. No: 10, 13 (8)
12. (a) (i) With a neat sketch explain the working principle of PMMC instrument. P. No: 29 (8)
- (ii) Explain the construction and its working principle of electro-dynamometer type wattmeter. P. No: 27 (8)

Or

- (b) (i) Discuss in detail, about the working principle and characteristics of CT with its phasor diagram. (10)
- (ii) Write a technical note on the magnetic measurements. (6)
13. (a) (i) Explain the theory and working principle of Wheatstone's bridge. Derive the relation for finding unknown resistance. P. No: 42 (8)
- (ii) Describe any one method for the measurement of high resistance. (8)

Or

- (b) (i) Explain the comparison method of measurement of inductance by Maxwell's LC bridge with its balance equations. P. No: 34 (8)
- (ii) Explain the measurement of frequency by Wien's bridge. (8)
14. (a) (i) Discuss the working principle of a Magnetic tape recorder. P. No: 55 (8)
- (ii) Explain the construction and functionalities of various components of a CRT display. P. No: 45 (8)

Or

- (b) (i) Compare and contrast the construction, working principle and applications of LED and LCDS. P. No: 57 (8)
- (ii) Write a detailed technical note on Data loggers. Explain how they differ from Data Acquisition systems. P. No: 52 (8)

15. (a) (i) Explain in detail, the working principle of piezoelectric transducers. P. NO: 68 (8)

(ii) Discuss any one method of D/A converter. P. NO: 73 (8)

Or

(b) (i) Describe in detail, the working principle of capacitive microphone. (8)

(ii) Write a detailed technical note on smart sensors. Explain also the various built-in features of them compared to conventional sensors. (8)

P. NO: 69



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Reg. No.

9	2	2	0	1	4	1	0	5	0	1	3
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**Question Paper Code : 57319**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**Fourth Semester**

**Electrical and Electronics Engineering**

**EE 6404 – MEASUREMENTS AND INSTRUMENTATION**

**(Regulations 2013)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. Name the dynamic characteristics of measurement systems.
2. What is meant by calibration of an instrument ?
3. Define creeping in energy meter ?
4. How are basic instruments converted into higher range ammeter ?
5. What is called a volt-ratio box ?
6. What is meant by grounding ?
7. Mention the role of Data loggers in Instrumentation system.
8. Distinguish between LED and LCD.
9. What are the factors to be considered for selection of transducers ?
10. List the types of Analog to Digital Converter ?

**PART – B (5 × 16 = 80 Marks)**

11. (a) (i) Explain the static characteristics of an instrument. (10)  
(ii) Explain in detail the calibration technique. (6)

**OR**

- (b) What are the different types of errors ? Explain how to eliminate errors in instruments. (16)

12. (a) With neat sketch, explain the construction and operation of repulsion type moving iron instrument. Give the advantages and limitations of such instruments. (16)

**OR**

- (b) (i) Obtain B-H curve of ring specimen. (8)  
(ii) Describe how to obtain iron loss of a ring specimen (8)

13. (a) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working principle. (16)

**OR**

- (b) (i) Explain how the inductance is measured in terms of known capacitance using maxwell's bridge. Derive the conditions for balance. (12)  
(ii) Why Hay's bridge is suited for measurement of inductance of high Q coils. (4)

14. (a) With neat diagram, explain the basic components and working principle of magnetic tape recorders. (16)

**OR**

- (b) Describe the construction and working of LCDs. Mention the difference between light scattering and field effect types of LCDs, also explain the advantages of LCDs.

15. (a) Explain in detail about construction and working of LVDT. (16)

**OR**

- (b) Explain smart sensors with built in features. Compare with conventional sensors. (16)

Reg. No. : 

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**Question Paper Code : 71497**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/080280016/10133 EE 302 — MEASUREMENTS AND  
INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 – Measurements and Instrumentation for B.E. (Part-Time)  
Third Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define static error. Classify the types of static error.
2. What is the significance of calibration?
3. What are the different types of digital voltmeter?
4. List out the methods used for measurement of iron loss in ferromagnetic materials.
5. What is the need for screening?
6. What is meant by self balancing bridges? Give two examples.
7. Distinguish the functional difference between Strip chart recorder and X-Y recorder.
8. What are the functions of a data logger?
9. What are the applications of LVDT?
10. Define smart sensors.

## PART B — (5 × 16 = 80 marks)

Standards

11. (a) Show the functional blocks of a generalized instrumentation system through a neat sketch. Also explain their functions in detail. (16)

Or

- (b) Eight different students timed in the circuit for resonance and the values of resonant frequency in kHz were recorded as 412, 428, 423, 415, 426, 411, 423 and 416. Calculate
- Arithmetic mean,
  - Deviation from the mean,
  - Average deviation, and
  - Standard deviation. (16)

12. (a) Describe the constructional details and working of the electro-dynamometer type wattmeter. What is the importance of deflection torque in these instruments? (12 + 4)

Or

- (b) Write short notes on :
- Use of current transformer for current and power measurement. (8)
  - Working of ferro-dynamic type electrical resonance frequency meter. (8)

13. (a) How a DC potentiometer is used for the calibration of a voltmeter? Explain it with a diagram. (16)

Or

- (b) (i) Discuss the effects of electro static and electromagnetic interference in instruments. (8)
- (ii) Write short notes on Grounding techniques. (8)

14. (a) Explain the principle of working of a magnetic tape recorder. What are its basic components and their functions? (10 + 6)

Or

- (b) With neat figure explain the working principle of a digital CRO. What are the advantages over analog CRO? (16)

15. (a) Explain the principle of the following transducers :

- ✓ (i) Strain gauges (8)
- (ii) Piezo electric transducers. ✓ (8)

Or

- (b) What is data acquisition system? Give the block diagram arrangement of a data acquisition system and describe the function of each component. (16)

Capacitive type Trans.



Reg. No. : 

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**Question Paper Code : 77134**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015

Fourth Semester

Electrical and Electronics Engineering

EE 6404 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Gross and random errors.
2. Illustrate the difference between accuracy and precision.
3. State the purpose of shunts in the Voltmeter.
4. A basic D'Arsonval movement with a full deflection of  $50 \mu A$  and internal resistance of  $500 \Omega$  is used as voltmeter. Determine the value of the multiplier resistance needed to measure a voltage range of 0 – 10V.
5. What is a potentiometer? List its applications?
6. Mention the grounding techniques available in measurements.
7. What is the technique used in strip chart recorders?
8. Compare plotters and printers.
9. Write the desired properties of thermocouple metals.
10. What are the two ways, that the DAS are used to measure and record analog signals?

PART B — (5 × 16 = 80 marks)

11. (a) By using a micrometer screw, the following readings were taken of a certain length :  
1.34, 1.38, 1.56, 1.47, 1.42, 1.44, 1.53, 1.48, 1.40, 1.59 mm. Calculate the following :
  - (i) Arithmetic mean
  - (ii) Average deviation
  - (iii) Standard deviation and
  - (iv) Variance.

(16)

Or

- (b) (i) Discuss the different types of standards of measurement. (8)
- (ii) Describe the static and dynamic characteristics of measuring instruments. (8)
12. (a) (i) Describe the basic magnetic measurement using B-H curve. (8)
- (ii) Explain the operating principle of instrument transformer. (8)
- Or
- (b) (i) Explain the methods of turns compensation used in Current transformers to reduce ratio error. (8)
- (ii) Explain the term 'loading' in voltmeter and give the method to remove the adverse effect of the same. (8)
13. (a) Explain the procedure of measuring a low resistance with help of Kelvin's double bridge. Derive the relation to finding unknown resistance. (16)
- Or
- (b) Describe in detail about :
- (i) Interference and screening. (8)
- (ii) Multiple earth and earth loops. (8)
14. (a) (i) Explain the segmental display and dot matrices display for numeric and alpha numeric displays. (12)
- (ii) Write short notes on data logging. (4)
- Or
- (b) (i) Draw and explain the Block diagram of digital CRO. (12)
- (ii) Describe different types of sweeps used in CRO. (4)
15. (a) Write short notes on the following :
- (i) Seeback effect.
- (ii) Piezo electric transducer.
- (iii) Resistance thermometers. (16)
- Or
- (b) (i) Explain the basic operation of A/D converter utilizing D/A Converter. (8)
- (ii) Explain the concept of Smart sensors. (8)



Reg. No. :

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**Question Paper Code : 71497**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Third Semester

Electrical and Electronics Engineering

EE 2201/EE 33/EI 1202/080280016/10133 EE 302 — MEASUREMENTS AND INSTRUMENTATION

(Regulation 2008/2010)

(Common to PTEE 2201 – Measurements and Instrumentation for B.E. (Part-Time) Third Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define static error. Classify the types of static error.
2. What is the significance of calibration?
3. What are the different types of digital voltmeter?
4. List out the methods used for measurement of iron loss in ferromagnetic materials.
5. What is the need for screening?
6. What is meant by self balancing bridges? Give two examples.
7. Distinguish the functional difference between Strip chart recorder and X-Y recorder.
8. What are the functions of a data logger?
9. What are the applications of LVDT?
10. Define smart sensors.

PART B — (5 × 16 = 80 marks)

11. (a) Show the functional blocks of a generalized instrumentation system through a neat sketch. Also explain their functions in detail. (16)

Or

- (b) Eight different students timed in the circuit for resonance and the values of resonant frequency in kHz were recorded as 412, 428, 423, 415, 426, 411, 423 and 416. Calculate

- (i) Arithmetic mean,
- (ii) Deviation from the mean,
- (iii) Average deviation, and
- (iv) Standard deviation. (16)

12. (a) Describe the constructional details and working of the electro-dynamometer type wattmeter. What is the importance of deflection torque in these instruments? (12 + 4)

Or

- (b) Write short notes on :

- (i) Use of current transformer for current and power measurement. (8)
- (ii) Working of ferro-dynamic type electrical resonance frequency meter. (8)

13. (a) How a DC potentiometer is used for the calibration of a voltmeter? Explain it with a diagram. (16)

Or

- (b) (i) Discuss the effects of electro static and electromagnetic interference in instruments. (8)
- (ii) Write short notes on Grounding techniques. (8)

14. (a) Explain the principle of working of a magnetic tape recorder. What are its basic components and their functions? (10 + 6)

Or

- (b) With neat figure explain the working principle of a digital CRO. What are the advantages over analog CRO? (16)

15. (a) Explain the principle of the following transducers :

- (i) Strain gauges (8)
- (ii) Piezo electric transducers. (8)

Or

- (b) What is data acquisition system? Give the block diagram arrangement of a data acquisition system and describe the function of each component. (16)

Reg. No.

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**Question Paper Code : 27217**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electrical and Electronics Engineering

EE 6404 – MEASUREMENTS AND INSTRUMENTATION

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define resolution and precision.
2. What is meant by calibration of an instrument?
3. Define creeping in energy meter.
4. State any two applications of CT and of PT.
5. List the various detectors used for AC bridges.
6. What is called a volt-ratio box?
7. What is the principal of operation of an ink-jet printer?
8. What are the functions of data logger?
9. What is a transducer? Give an example.
10. What is meant by resolution for Analog Digital Converter?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the functional elements of an instrument with a neat block diagram. (10)  
(ii) In a test, temperature is measured 100 times with variations in apparatus and procedures. After applying the corrections, the results are :

Temp <sup>o</sup> C	397	398	399	400	401	402	403	404	405
Frequency of occurrence	1	3	12	23	37	16	4	2	2

Calculate.

- (1) Arithmetic mean
- (2) Mean deviation
- (3) Standard deviation. (6)

Or

- (b) (i) Explain the static characteristics of an instrument. (10)
- (ii) Explain in detail systematic error. (6)

12. *Watt meter* (a) With circuit and phasor diagram, explain the working of single phase ac energy meter.

Or

- (b) Write a short notes on :
  - (i) Current Transformer (8)
  - (ii) Weston frequency meter (8)

13. (a) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working principle.

Or

- (b) Explain about
  - (i) Electrostatic and electromagnetic interference.
  - (ii) Need for Grounding for measuring instruments.

14. *LED* (a) With neat diagram, explain the basic components and working principle of magnetic tape recorders.

Or

- Dot matrix DISP.* (b) With neat figure explain the working principle of a digital CRO. What are its advantages over analog CRO?

15. (a) Explain in detail about construction and working of LVDT.

Or

- (b) Explain successive approximation type ADC with its characteristics.