

**A**

**Reg. No. :**

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 54306**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Fourth Semester

Electrical and Electronics Engineering

15UEE406- ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. Accuracy of a measuring instrument indicates the \_\_\_\_\_ CO1- R
  - (a) Closeness of the output reading to the true value
  - (b) Ratio of output value to the input value
  - (c) Change in output with each change in input
  - (d) Degree of freedom from random errors
  
2. Which of the following are integrating instruments? CO1- R
  - (a) Ammeters (b) Voltmeters
  - (c) Wattmeters (d) Ampere-hour and watt-hour meters
  
3. In a low power factor wattmeter the compensating coil is connected \_\_\_\_\_ CO2- R
  - (a) in series with current coil (b) in parallel with current coil
  - (c) in series with pressure coil (d) in parallel with pressure coil
  
4. Induction type single phase energy meters measure electric energy in CO2- R
  - (a) kW (b) Wh (c) VAR (d) kWh
  
5. In order to achieve high accuracy, the slide wire of a potentiometer should be \_\_\_\_\_ CO3- R
  - (a) as long as possible (b) as short as possible
  - (c) neither too small not too large (d) very thick

6. For measurement of inductance having high value, we should use \_\_\_\_\_ CO3- R  
 (a) Maxwell's bridge (b) Maxwell Wein bridge  
 (c) Hay's bridge (d) Schering bridge
7. X-Y recorders is the type of \_\_\_\_\_ CO4 -R  
 (a) Graphic recorders (b) Oscillographic recorders  
 (c) Magnetic tape recorders (d) Digital recorders
8. Band width of CRT will be \_\_\_\_\_ CO4 -R  
 (a) Up to 10 KHz (b) Up to 100 KHz (c) Up to 1 MHz (d) up to 10 MHz
9. Strain gauge is a \_\_\_\_\_ CO5- R  
 (a) Active device and converts mechanical displacement into a change of resistance  
 (b) Passive device and converts electrical displacement into a change of resistance  
 (c) Passive device and converts mechanical displacement into a change of resistance  
 (d) Active device and converts electrical displacement into a change of resistance
10. Which of the following is a type of error associated with digital-to-analog converters (DACs)? CO5- R  
 (a) nonmonotonic error (b) non monotonic and offset error  
 (c) offset error (d) incorrect output codes

PART – B (5 x 2= 10Marks)

11. Give the international standards of instruments CO1- R
12. Why PMMC ammeters are most used? CO2- R
13. Specify the sources of electromagnetic interference CO3- R
14. State the principle of ink-jet printer CO4- R
15. Mention the basic requirements of a transducer. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) (i) With a neat block diagram, describe the functional elements of an instrument. CO1-U (8)  
 (ii) Describe the dynamic characteristics of measuring instrument. CO1-U (8)
- Or
- (b) (i) What are different types of errors and the sources of errors? CO1-U (8)  
 Explain how to eliminate errors in instruments

- (ii) 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.
17. (a) Describe the construction and working principle of single phase induction type energy meter. Write a short note on any two adjustments required in energy meters. CO2-U (16)
- Or
- (b) (i) Describe the construction and working of Weston frequency meter. CO2-U (8)
- (ii) Obtain B-H curve of ring specimen. CO2-App (8)
18. (a) (i) Draw the diagram of Co-ordinate type A.C. potentiometer and explain its working in detail. CO3-U (8)
- (ii) Illustrate about the working principle of Kelvin's double bridge method for measurement of low resistance. Derive the relation for finding unknown resistance. CO3-U (8)
- Or
- (b) (i) Describe a bridge to determine the unknown inductance with a neat sketch. Derive the relevant equations and explain the computation procedure using phasor diagram. CO3-U (8)
- (ii) Elaborate in detail about Grounding techniques. CO3-U (8)
19. (a) What is an XY recorder? How do you distinguish it from a X-t or a Y-t recorder? Explain, with suitable circuit diagram, the working of an XY recorder. CO4-U (16)
- Or
- (b) With neat sketch explain the working principle of a digital CRO. What are its advantages over analog CRO? CO4-U (16)
20. (a) Describe the working principle of LVDT with neat sketch. State the advantages of LVDT. CO5-U (16)
- Or

- (b) (i) With generalized block diagram, explain the function of data acquisition system. CO5-U (8)
- (ii) Discuss about successive approximation type ADC with its characteristics in detail. CO5-U (8)