B.E.(with Credits)-Regular-Semester 2012-Instrumentation Engineering Sem III

IN 305 - Electronics Measurements

P. Pages : 2 **GUG/W/16/3780**

Time : Three Hours * 3 6 2 5 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.
4. Same answer book must be used for each question.

1. a) Write a short note on : **8**

i) Fundamental unit.

ii) Derived unit

b) A voltmeter is accurate to 98% of its full scale reading. If it reads 200 V on 500 V range. What is the absolute error & percentage error. **8**

OR

2. a) Explain why PMMC instruments are the most widely used instruments ? Discuss their advantages & disadvantages. **8**

b) Explain different types of error in measurements. **8**

3. a) Explain why PMMC instruments are the most widely used instruments ? Discuss their advantages & disadvantages. **8**

b) A shunt type ohmmeter uses a 10 mA basic 'd' Arsonval movement with an internal resistance of 5 Ω. The battery emf is 3 V. It is desired to modify the circuit by adding appropriate shunt resistance across the movement so that its instruments indicate 0.5Ω at the midpoint on its scale. Calculate **8**
i) the value of shunt resistance.
ii) The value of current limiting resistance R_1.

OR

4. a) Describe the construction details & working of on electrodynamometer type instruments. **8**

b) How is the current range of a PMMC instruments extended with help of shunts ? Describe a method of reducing error due to temp. changes in the shunt connected instruments. Illustrate with an example. **8**

5. a) Write a methods for measurements of resistance using Wheatstone bridge & also write limitations of Wheatstone bridge. **8**

b) With phasor diagram, explain the bridge used for measurements of self inductance for coils having Q > 10 (Hay's bridge) **8**

OR

6. a) A Kelvin's bridge is balanced with the following constants : **8**
Outer ratio arm = 100 Ω & 1000 Ω
Inner ratio arm = 99.92 Ω and 1000.6 Ω
resistance of link = 0.1 Ω
standard resistance = 0.00377 Ω
Calculate the value of unknown resistance.

b) Explain the sources & electrons used in A.C. bridges. **8**

7. a) Explain successive approximation type digital voltmeter. **6**

b) Write a short note on : **4**
Ramp type DVM.

c) Describe the circuit & working of Q meter. **6**

OR

8. a) Describe how connection for shunt resistance & distributed capacitance are applied when measuring Q factor of a coil with a Q meter. **8**

b) Explain with the help of block diagram the various parts of an electronic multimeter. **8**

9. a) Derive an expression for vertical deflection of an electron beam in a CRT. **8**

b) Explain the block diagram of dual trance oscilloscope. **8**

OR

10. a) An electrically deflected CRT has a final anode voltage of 2000V & parallel deflecting plates 1.5 cm long and 5 mm aport. If the screen is 50 cm from the center of deflecting plates, find if mass of electron = 9.1×10^{-31} kg. **9**

i) Beam speed of charge of electron 1.6×10^{-19} C
ii) The deflection sensitivity of the tube
iii) The deflection factor of the tube.

b) Discuss in detail the delay sweep. **7**

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