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10IT35

Third Semester B.E. Degree Examination, January 2013
Electronic Instrumentation

Time: 3 hrs.

Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Discuss briefly the different types of static errors of a measuring instrument. **(06 Marks)**
   b. Calculate the value of the multiplier resistance on the 100 V range of a dc voltmeter that uses a 100 mA meter movement with an internal resistance of 100 Ω. **(06 Marks)**
   c. Explain the principle and operation of a true rms responding voltmeter with the help of a suitable block diagram. **(08 Marks)**

2 a. List the advantages of digital instruments over analog instruments. **(04 Marks)**
   b. Explain with the help of a neat diagram the working of a digital frequency meter. **(07 Marks)**
   c. A 3½ digit voltmeter is used for measuring voltage,
      i) Find the resolution of the instrument.
      ii) How would be a reading 15.53 be displayed on 100 V range? **(04 Marks)**
   d. Discuss briefly the general specifications of a digital voltmeter. **(05 Marks)**

3 a. Draw the basic block diagram of an oscilloscope and explain the functions of each block. **(08 Marks)**
   b. Explain the functions of various controls on the front panel of a CRO. **(04 Marks)**
   c. Write an explanatory note on dual beam CRO with a block diagram. **(08 Marks)**

4 a. Explain the operation of a sampling oscilloscope with a block diagram. Mention the advantage of a sampling oscilloscope. **(10 Marks)**
   b. Discuss the operation of a digital storage oscilloscope with a neat block diagram. **(10 Marks)**

PART – B

5 a. Explain the operation of a sweep frequency generator with the help of a suitable block diagram. Mention its applications. **(08 Marks)**
   b. What is a frequency synthesizer? Explain the operation with a suitable block diagram. **(08 Marks)**
   c. Write a brief note on function generator. **(04 Marks)**

6 a. With the help of a neat circuit diagram, explain the operation of the wien bridge. Derive the expression for the frequency. Mention the limitations of this bridge. **(08 Marks)**
   b. What is meant by 'Wagner's earth connection? Explain with a suitable diagram. **(06 Marks)**
   c. A highly sensitive galvanometer can detect a current as low as 0.1 μA. This galvanometer is used in the wheatstone bridge as a detector. The resistance of the galvanometer is negligible. Each arm of the bridge has a resistance of 1 KΩ. The input voltage applied to the bridge is 20 V. Calculate approximately the smallest change in resistance which can be detected. **(06 Marks)**

7 a. List the factors to be considered while selecting a transducer for a given application.

(04 Marks)

   b. Explain the method of measuring displacement using LVDT with a suitable diagram. State the advantage and disadvantages of LVDT. **(10 Marks)**

   c. A 100 Ω strain gage with a gage factor of 1 is affixed to a metal bar. The bar is stretched and this causes a change in resistance of 0.001 Ω. Find the change in length if the original length is 10 cm. **(06 Marks)**

8 a. Describe the operation of a piezo electric transducer with a diagram. Mention its disadvantage. **(06 Marks)**

   b. What are the advantages of LCD displays over LED displays? **(04 Marks)**

   c. Explain the procedure of measuring power using a bolometer in a bridge circuit. Mention the range of power which can be measured in this method. **(06 Marks)**

   d. Write an explanatory note on signal conditioning. **(04 Marks)**

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