R16

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B
consists of 5 Units. Answer any one full question from each unit. Each question carries
10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Distinguish between error and correction and how they are usually expressed for an Instrument. [2]
 b) Define Distortion of a periodic signal and how it is estimated? [3]
 c) Explain the function of attenuator in CRO. [2]
 d) List the applications of Digital voltmeters. [3]
 e) What is the Significance of Spectrum Analyzer? [2]
 f) List the applications of Wave Analyzer. [3]
 g) List the basic requirements of a transducer. [2]
 h) Explain the working principle of a Strain gauge. [3]
 i) Explain about Bourdon tube usage in pressure measurement. [2]
 j) What is Gauge sensitivity? Explain. [3]

PART - B

(50 Marks)

2.a) Distinguish between the static and dynamic characteristics of a measuring system and give their relevance with respect to measuring process.
 b) Explain the term fidelity of an instrument and explain it with an example. [5+5]

OR

3.a) Derive the expression for a frequency modulated signal and show how the number of side – bands increases with modulation index.
 b) What is the difference between sampling process and pulse modulation? [5+5]

4.a) With the help of a neat diagram explain the main parts of a cathode ray tube.
 b) Explain how the following measurements can be made with the use of CRO. [5+5]
 i) Frequency   ii) Phase Angle

OR

5. Explain the working of Digital frequency meter with a neat sketch. [10]

6.a) Explain the working of resonant or basic Wave Analyzer with a neat diagram.
 b) Explain the information that is provided by the Spectrum analysis. [5+5]

OR

7.a) Explain the working of Heterodyne harmonic Analyzer with a neat block diagram.
 b) List the applications of Spectrum analyzer. [5+5]

8. A parallel plate capacitive transducer uses plates of area 300 mm² which are separated by a distance 0.2 mm. a) Determine the value of capacitance when the dielectric is air having a permittivity of 8.85×10^{-12} F/m. b) Determine the change in capacitance if a linear displacement reduces the distance between the plates to 0.18 mm. Also determine the ratio of per unit change of capacitance to per unit change of displacement. c) If a mica sheet 0.01 mm thick is inserted in the gap, calculate the value of original capacitance and change in capacitance for the same displacement. Also calculate the ratio of per unit change in capacitance to per unit change in displacement. The dielectric constant of mica is 8. [10]

OR

9.a) List the advantages and disadvantages of Electric transducers.
 b) Explain the construction and working of Strain gauge load cell. [5+5]

10. Explain how capacitive type of transducers can be used for pressure measurement. [10]

OR

11. Explain the following for measuring speed of a rotating system:
 a) D.C. tachometers
 b) A.C. tachometers. [5+5]

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