Total No. of Questions : 12]

SEAT No. :

P843

[Total No. of Pages : 4

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B.E. (Electronics & Telecommunication) (Semester - II)
d - TEST AND MEASUREMENT SYSTEMS
(2008 Course) (Elective - III)

Time : 3Hours]   *[Max. Marks :100*

Instructions to the candidates:

1) *Answer three questions from Section - I and three questions from Section - II.*
2) *Answers to the two sections should be written in separate answer books.*
3) *Figures to the right indicate full marks.*
4) *Neat diagrams must be drawn wherever necessary.*
5) *Your answers will be valued as a whole.*
6) *Assume suitable additional data if necessary.*
7) *Use of logarithmic tables, slide rule, electronic non-programmable pocket calculator is allowed.*

SECTION-I

Q1) a) What do you understand by static characteristics? List and define different static characteristics. Discuss the difference between accuracy and precision of a measurement. **[10]**

b) Draw a typical instrument block diagram. Explain simple & distributing types of measurements in detail. **[8]**

OR

Q2) a) With the help of neat diagrams, explain: **[10]**

i) Direct comparison calibration setup.

ii) Indirect comparison calibration setup.

iii) Echelon of traceability.

b) For the following given data, calculate **[8]**

i) Arithmetic mean

ii) Average deviation

iii) Standard deviation

iv) Variance

Given, $x_1 = 49.7$; $x_2 = 50.1$; $x_3 = 50.2$; $x_4 = 49.6$; $x_5 = 49.7$.

P.T.O.

Q3) a) What is the significance of Q-factor? Explain basic 'Q' meter with neat diagram. **[8]**

b) What are different types of DVM? With the help of block diagram explain **[8]**

i) Ramp-type DVM and

ii) Successive-approximation DVM.

OR

Q4) a) With the help of block diagram explain vector impedance meter. **[10]**

b) Compute the value of self capacitance of coil when the following measurements are made: At frequency $f_1 = 2$ MHz, the tuning capacitor is set at 450 pF. When the frequency is increased to 5 MHz, the tuning capacitor is tuned at 60 pF. **[6]**

Q5) a) Describe with diagram the operation of dual beam CRO. Compare dual beam and dual trace CRO. **[8]**

b) Explain the function of the following controls: **[8]**

i) Z modulation

ii) Intensity

iii) ALT / CHOP mode

iv) Astigmatism

OR

Q6) a) Explain the triggering controls used in analog and digital oscilloscope. What are the special trigger settings available only in digital oscilloscope? **[8]**

b) Explain various sampling and interpolation methods used in DSO. **[8]**

SECTION-II

Q7) a) Explain FFT analyzer with neat block diagram. What resolution, total frequency display, and dynamic range would be available from an input signal that was sampled for 4 s at a sampling rate of 20 kHz using a 10 bit conversion? **[10]**

b) Define: **[8]**

    i)   Distortion

    ii)   Harmonic Distortion

    ii)   Distortion factor.

Why is it necessary to measure distortion? List various methods used for measurement of harmonic distortion.

OR

Q8) a) Draw a detail block diagram of Tracking Generator Counter and explain its working. What is the resolution of a spectrum analyzer using an IF filter with a 3 dB bandwidth of 30 kHz? **[10]**

b) What is meant by spectrum analysis? List types of spectrum analyzer. What are the applications of spectrum analyzer? What are its limitations? **[8]**

Q9) a) Draw and explain the block diagram of an Arbitrary Waveform Generator (AWG). What is meant by vertical resolution? **[8]**

b) Draw and explain block diagram of network analyzer and state its applications. **[8]**

OR

Q10) a) What are the different ways to measure VSWR? With the help of detail block diagram explain the swept frequency VSWR technique. **[8]**

b) List the different types of classes for measurement of attenuation or gain. Explain in detail the following classes: **[8]**

    i)   rf substitution

    ii)   audio or dc substitution

*Q11)*a) With the help of block diagram explain automatic test system to analyze an audio amplifier. **[8]**

b) Explain the detail structure of IEEE 488 instrumentation bus used to interface frequency counter with computer. **[8]**

OR

*Q12)*a) What are the requirements of the Automatic Test Equipments (ATE).**[8]**

b) Explain features of software used for virtual instruments. **[8]**

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