

ESTC

College of Engineering, Pune
End Semester Exam – Apr/May 2013
TY B TECH (E & TC)
Subject - Electronics Measurement

Date: 02 April 2013
Maximum Marks: 50

Time: 2 to 5 p.m.
Duration : 3 hrs.

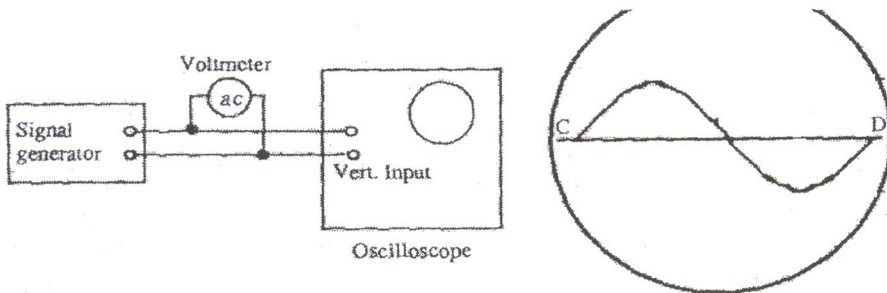
Instructions:

1. All Questions are compulsory.
2. Figure to the right indicates full marks.
3. Assume suitable data, if necessary.
4. Draw neat diagrams wherever required.
5. Do not carry Mobile and programmable calculator.

Q1) Answer any **FOUR** with 5 marks each :

a) (i) How do you differentiate between Galvanometer & other Electro-mechanical indicating instruments with respect to CRO?

(ii) As shown in Fig. the signal generator is used to produce a 1000 Hz. 1 Volt. sine wave. The AC voltmeter & the leads to the vertical i/p of the oscilloscope are connected across the generator's o/p. what will be the relationship observed between the readings of both the measuring instruments?



Fig

b) What trigger mode determines in oscilloscope? How do you differentiate between common trigger modes such as Normal & Auto?

c) Draw basic block diagram of most commonly used spectrum analyzer. What type of spectrum analyzer is provided on add-on board used in oscilloscope? How it is different than commonly used spectrum analyzer?

d) Draw the neat block diagram to indicate how frequency counter can be used for

1. Period Measurement
2. Totalizer
3. Ratio mode (operation) or as a digital tachometer

e) Draw the block of digital synthesizer with 18 MHz source frequency using crystal oscillator. Obtain pure and without any undesired modulation frequency output from 2.00 MHz to 2.09 MHz using Direct synthesis technique.

Suggest one common domestic application of digital synthesizer.

Q2) a) Draw the block schematic of computer controlled measurement system for testing a radio receiver?

What is the recommended cable length for GPIB?

Specify maximum no. of devices can be interfaced and also mention maximum rate of data transmission using same bus?

What is the data width observed, while transmitting over the GPIB bus.

Whether data communication is Simplex, Half duplex or Full duplex or any combination? (10)

b) Determine the variation of the power dissipation of a electronic system with current, the following table results are obtained

Current (I) in (mA)	40	45	50	55	60
Power Dissipation (P_d) in (mW)	1.38	1.43	1.46	1.49	1.56

Fit a straight line to this data set using Least-Square regression and estimate the Power dissipation (P_d) at a current of 53mA

(5)

Q3) Answer any **THREE** with 5 marks each:

a) Draw the General form (basic ckt) for an A.C. bridge & explain its operation. Discuss the adjustment procedure for obtaining bridge balance, and derive the balance equations.

b) A DSO has a sampling rate of 100 MS/s. Determine record length of 3 MHz. sine wave & 15 μ s pulse during one cycle of each. Also determine the max. time period of a glitch that might be missed in sampling process.

c) What is the need of dB scale on vertical axis in the spectrum analyzer? If input to spectrum analyzer is a FM wave with modulation index to be Eigen value, what display will be produced by spectrum analyzer?

d) Ten measurements of the resistance of a resistor gave 101.2Ω , 101.7Ω , 101.3Ω , 101.0Ω , 101.5Ω , 101.3Ω , 101.2Ω , 101.4Ω , 101.3Ω , 101.1Ω . Assume that only random errors are present. Calculate

(i) The arithmetic mean (ii) The standard deviation (iii) The probable error

e) Calculate the quantizing error for a 16-bit ADC used in digital multi-meter and also determine the resolution of the output from a 12-bit DAC

*****GOOD LUCK*****

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