

B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2013)

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U13ECT302:Measurements and Instrumentation

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The standard deviation of a finite number of data is given by
 - a) $\sqrt{\sum dt/n}$
 - b) $\sqrt{\sum dt/n^2}$
 - c) $\sqrt{\sum dt^2/n-1}$
 - d) $\sqrt{\sum dt^2/n+1}$
2. The current range of the dc ammeter may be further extended by a number of shunts selected by a range switch. Such a meter is called a -----
3. The presence of distributed capacitance in a coil modifies the ----- and the inductance of the coil.
 - a) Insertion loss
 - b) Self capacitance
 - c) Effective Q
 - d) Shorting strap
4. When a target is bombarded by a stream of primary electrons an energy transfer takes place which separates other electrons from the surface of the target in a process known as -----

5. Function generator delivers sine, triangular and square waves with a frequency range of
 - a) 0.1 HZ to 1000KHZ.
 - b) 0.01 HZ to 100 KHZ
 - c) 0.2HZ to 10 KHZ
 - d) 0.1HZ to 10 KHZ
6. Nonlinear behavior of circuit elements introduces harmonics of the fundamental frequency in the output waveform and the resultant distortion is often referred to as -----
7. The heart of the frequency counter is -----
 - a) Time base generator
 - b) Input signal processor
 - c) Decade counter
 - d) Memory
8. ----- errors are caused by momentary frequency variations due to voltage transients, shock, vibration and electrical interference.

9. ----- is both driver and receiver.
- a) Relay switched attenuator b) Frequency counter
- c) IEEE 488 interface d) Shift register
10. are used for translating physical parameters into electrical signals.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. The floor area of an office building is 5000m^2 . Calculate the floor area in ft^2 . Given one $\text{ft} = 0.3048\text{m}$.
12. List any two measurement errors found in Wheatstone bridge.
13. The first measurement is at $f_1 = 2\text{ M Hz}$ and $C_1 = 460\text{pF}$. The second measurement at $f_2 = 4\text{ M Hz}$ yields a new value of tuning capacitor $C_2 = 100\text{ pF}$. Find the distributed capacitance C_d .
14. Identify and write the name of the block which is used to synchronize the horizontal deflection with the vertical input in general purpose oscilloscope.
15. Define about reciprocal mixing.
16. Draw the linearizing circuit for a sweep generator.
17. Compare Analog and Digital techniques.
18. Give any two suggestions to get maximum accuracy if trigger level error occurs in Frequency counters.
19. Name the two basic types of attenuators.
20. How much elapsed time would occur to a reflection from a break in an optical fiber at 1.4km if the index of refraction of the core was 1.55 .

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Discuss Wheatstone, Hay and Wien bridge with relevant circuit diagram.
22. a) Discuss about the three methods for connecting unknown components to the test terminals of a Q-meter in detail.

(OR)

- b) Write short notes on the following
- (i) Digital storage oscilloscope using analog delay line (7)
- (ii) RF voltage and power measurements (7)

23. a) (i) Formulate a generator where we can able to get wide frequency range from the fixed frequency oscillator. (10)
(ii) List the elements present in the fundamental suppression distortion analyzer (4)

(OR)

- b) (i) Design a spectrum analyzer (block diagram only) given the following parameters. Frequency range: 200 MHz to 500 MHz; I IF - 400 MHz, RBW – 10 KHz; II IF- 25 MHz, RBW – 100 Hz. Identify the type of filters, bandwidth of filters and frequency of local oscillators. (10)
(ii) Draw the circuit of Hartley oscillator using a bipolar junction transistor (4)
24. a) Categorize the various types of Digital voltmeters and explain.

(OR)

- b) (i) Discuss the methods to extend the frequency range of the counter (10)
(ii) Write short notes on gating error. (4)
25. a) Elaborate interfacing of transducers to electronic control and measuring systems.

(OR)

- b) (i) Discuss the instruments used in computer controlled instrumentation (10)
(ii) Compare Analog data acquisition system with Digital data acquisition system. (4)
