KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

Regulation 2009

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE109: Measurements and Instrumentation

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. A well calibrated voltmeter may give a misleading reading when connected across two points in a high resistance circuit. This error is called as _____

   a) Systematic error b) Random error

   c) Limiting error d) Gross error

2. Calculate the height in cm of a man 5ft 11 inchs.

   a) 177.8 b) 180.34

   c) 152.4 d) 182.88

3. Choose the correct meter that is useful in measurement of two port network parameter.

   a) Vector voltmeter b) Voltmeter

   c) Ammeter d) Q meter

4. In CRO, sweep generator output is given to _____

   a) Vertical deflection system b) Horizontal deflection system

   c) Time base generator d) Vertical amplifier

5. Identify the analog instrument that is used for stable and noise free operation of synthesizer.

   a) Loop filter b) Phase detector

   c) Programmable divider d) Voltage-controlled oscillator

6. Wave analyzer act as a _____

   a) Harmonic analyzer b) Harmonic analyzer

   c) Frequency selective voltmeter d) Frequency counter

7. Recall the error that is caused by momentary frequency variations due to shock and vibration.

a) Time base error
b) Short-term crystal stability error
c) Long-term crystal stability error
d) Gating error

8. Ripple binary coded decimal counter can be constructed from _____

a) Four Flip-flops
b) Four flip-flops and AND gate
c) Four AND gates and flip-flop
d) Four AND gates

9. Which one gives the finite gain?

a) Differentiator
b) Filter
c) Operational amplifier
d) Instrumentation amplifier

10. In optical time domain reflectometer, the reflected light energy would be displayed by using _____

a) Oscilloscope
b) LED
c) Seven segment display
d) Dot matrix

PART B (10 x 2 = 20 Marks)

11. Distinguish between accuracy and precision.
12. Classify the types of standards based on their function and applications.
13. Analyze the significant problems with diodes used for RF rectification.
14. Outline the features of digital storage oscilloscope.
15. Define frequency synthesizer.
16. Summarize the applications of wave analyzer.
17. Compare analog instruments with digital instruments.
18. Identify the suggestions to achieve the maximum accuracy in trigger level error.
19. List the disadvantages of end-to-end measurement of fiber system loss.
20. What is meant by digital-to-analog multiplexing?

PART C (5 x 14 = 70 Marks)

21. a) (i) Develop true RMS-voltmeter using two thermocouples and explain. (7)

(ii) Design a Maxwell's bridge to indicate zero output at the detector. The fixed component values are R_2=400Ω, R_3=600Ω, R_1=1kΩ C_1=0.5μF and choose appropriate values for remaining components. (7)

(OR)

b) (i) Explain about moving coil ammeter and voltmeter. (7)

(ii) Construct a bridge circuit with the component values of C_3=500pF, R_2=300Ω, R_1=72.6Ω C_1=0.148μF and choose appropriate values for C_x and R_x to balance the bridge. (Assume: R_4 and C_4 are in parallel). (7)

22. a) Discover the method to measure the impedance over a wide frequency range.

(OR)

b) (i) Demonstrate the operation of sampling oscilloscope for repetitive input waveform. (8)

(ii) Explain the concept of Q meter with direct connection. (6)

23. a) (i) With neat sketch explain the concept of Fundamental-suppression harmonic distortion analyzer. (10)

(ii) Construct the block diagram of general purpose spectrum analyzer. (4)

(OR)

b) Explain the basic elements of a function generator and explain in detail.

24. a) Explain Staircase-ramp digital voltmeter with neat sketch.

(OR)

b) (i) How can you extend the frequency range by using automatic heterodyning unit? (7)

(ii) Illustrate the function of simple frequency counter. (7)

25. a) (i) Examine the elements of digital data acquisition system in detail. (7)

(ii) Discover the operation of optical power meter. (7)

(OR)

b) Illustrate the IEEE 488 electrical interface.

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