B.E. DEGREE EXAMINATIONS: OCTOBER / NOVEMBER – 2008

Third Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EE303 Measurements and Instrumentation

Time: Three Hours   Maximum Marks: 100

Answer ALL Questions: -

PART A (20 X 1 = 20 Marks)

1   In measurement systems, which of the following are undesirable static characteristics
    (a) Sensitivity and accuracy
    (b) Drift, static error and dead zone
    (c) Reproducibility and non-linearity
    (d) Drift, static error, dead zone and non linearity

2   An (0 – 10) A ammeter has a guaranteed accuracy of 1 % of full scale deflection. The limiting error while reading 2.5 A is
    (a) 1 %
    (b) 2 %
    (c) 4 %
    (d) 0.25 %

3   The power in a three phase circuit is measured with the help of two wattmeters. The reading of one of wattmeter is positive and that of the other is negative. The magnitude of readings is different. It can be concluded that the power factor of the circuit is
    (a) Unity
    (b) Zero (lagging)
    (c) 0.5 (lagging)
    (d) Less than 0.5 (lagging)

4   In a reed type frequency meters all the reeds
    (a) have the same natural frequency
    (b) have different natural frequency
    (c) have different natural frequency but the difference in natural frequency of adjacent reeds is ± 0.5 Hz
    (d) have different natural frequency but the difference in natural frequency of adjacent reeds is ± 2 Hz

5   A Potentiometer is basically a
    (a) deflectional type instrument
    (b) null type instrument
    (c) deflectional as well as null type instrument
    (d) a digital instrument

6   Frequency can be measured by using
       (a) Maxwell's bridge
       (b) Schering Bridge
       (c) Heaviside Campbell bridge
       (d) Wein's bridge

7   In Principle, a potentiometer is a device for
       (a) Comparing two voltages
       (b) Comparing two currents
       (c) Comparing a current and a voltage
       (d) measuring a voltage

8   A Virtual ground
       (a) is a ground for voltage
       (b) is a ground for current
       (c) is a ground for both voltage and current
       (d) is a ground for voltage but not for current

9   In a direct magnetic tape recording system, the reproducing head and amplifier characteristics are
       (a) - 6 dB / Octave, + 16 dB / Octave
       (b) - 6 dB / Octave, + 26 dB / Octave
       (c) + 6 dB / Octave, - 6 dB / Octave
       (d) - 20 dB / Octave, + 20 dB / Octave

10 X -- Y recorders
       (a) Record one quantity with respect to another quantity
       (b) Record one quantity on X axis with respect to time on Y axis
       (c) Record one quantity on Y axis with respect to time on X axis
       (d) Record both the quantity with respect to time

11 LEDs emit light
       (a) Only in red colour
       (b) Only in yellow colour
       (c) Only in green colour
       (d) In red, green, yellow and amber colour

12 The X plates of a CRO are fed by
       (a) DC wave
       (b) AC wave
       (c) Triangular wave
       (d) Sawtooth wave

13 The transducer converts
       (a) Mechanical energy into electrical energy
       (b) Mechanical displacement into electrical signal
       (c) One form of energy into another form of energy
       (d) Electrical energy into mechanical energy

14 Capacitive transducers can be used for measurement of liquid level. The principle of operation used in this case is
       (a) Change of capacitance with change of distance between plates
       (b) Change of area of plates
       (c) Change of dielectric strength
       (d) Change of contacts in the terminals

15 The maximum output current in the binary weighted resistance digital to analog converter is

(a) $I_{max} = \frac{E_R}{2^n} \frac{2^{n-1}}{R}$

(b) $I_{max} = \frac{E_R}{2^n-1} \frac{2^n-1}{R}$

(c) $I_{max} = E_R \frac{2^{n-1}}{R}$

(d) $I_{max} = \frac{E_R}{2^n-1} \frac{2^n}{R}$

16 Air cored inductive transducers are suitable for use
(a) At lower frequencies
(b) At higher frequencies
(c) At equal frequencies
(d) At frequency which is less than natural frequency

17 LABVIEW Stands for
(a) Laboratory Virtual Instrument Electronics World
(b) Laboratory Virtual Instrument Electronics Workbench
(c) Laboratory Virtual Instrument Electronics Work
(d) Laboratory Virtual Instrument Electronics Web

18 G Programming means
(a) Graphical programming
(b) General Programming
(c) Genetic Programming
(d) Geiling Programming

19 What is the maximum array size in LabView?
(a) 2^{32}
(b) $2^{32}-1$
(c) $2^{32}-2$
(d) $2^{32}-3$

20 LabView Software supports the _____ Software.
(a) PsPice
(b) VisSim
(c) MATLAb
(d) PSim

PART B (5 X 16 = 80 Marks)

21 a   i   Explain different types of errors in measurements with suitable examples.   8

       ii Describe the construction and working of PMMC instrument with neat diagram.   8

(OR)

21 b   i   Write short note on the constructional details of an electrodynamometer type   8
           wattmeter.

       ii Describe with neat diagram, how high currents and voltages are measured with   8
           the help of instrument transformer.

22 a   i   Explain the working of Maxwell's inductance capacitance bridge and also   10
           mention is advantages and disadvantages.

ii What you mean by transformer double ratio bridges?

(OR)

22 b i Explain the function and working of Wagner earth devices.

ii Write a technical note on Electrostatic and Electromagnetic interference.

23 a i Explain the principle and basic components of a tape recorder.

ii Give an overview of different digital display devices.

(OR)

23 b Explain how the phase angle and frequency is measured using cathode ray oscilloscope with necessary lissajous pattern.

24 a i Explain the construction and principle of working of a linear variable differential transformer (LVDT). Explain how the magnitudes and direction of the displacement of core of an LVDT detected?

ii Explain the construction and working of piezo- electric transducers.

(OR)

24 b i Explain the data acquisition system with neat block diagram.

ii Describe any one method of analog to digital conversion with relevant diagram.

25 a i With neat diagram explain the various charts and graphs in LabView software.

ii Explain different type of Data Acquisition System.

(OR)

25 b i Explain 6225 DAC Card with relevant diagram.

ii Brief the various loops and structures used in LabView software.

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