Electrical and Electronics Measurement MCQ 1

1. Which bridge is used to determine frequency?

(a) Anderson bridge.

(b) De Sauty bridge.

(c) Wien bridge.

(d) Campbell bridge.

Answer: (c) Wien bridge.

2. Which one of the following is a frequency sensitive bridge?

(a) De-Sauty bridge.

(b) Schering bridge.

(c) Wien's bridge.

(d) Maxwell's bridge.

Answer: (c) Wien's bridge.

3. Which of the following bridges can be used to construct a harmonic distortion analyzer ?

1. Maxwell bridge.

2. Hay bridge.

3. Schering bridge.

4. Wien bridge.

Select the correct answer using the code given below Code :

(a) Only 1 and 2

(b) Only 2 and 3.

(c) Only 3 and 4.

(d) Only 4.

Answer: (d) Only 4.

4. Consider the following statements in respect of a Wien bridge.

1. It is suitable for measurement of capacitance.

2. It is not affected by harmonics present in the applied voltage.

3. It is suitable for measurement of frequency.

Which of these statement are correct ?

(a) 1, 2 and 3.

(b) 1 and 2.

(c) 2 and 3.

(d) 1 and 3.

Answer: (d) 1 and 3.

5. In Wien bridge

(a) balanced conditions are independent of frequency.

(b) balanced conditions are dependent on frequency.

(c) capacitance is measured in terms of standard inductance.

(d) frequency is measured in terms of resistance and capacitance values.

Answer: (b) balanced conditions are dependent on frequency.

6. Schering bridge can be used to measure which one of the following?

(a) Q of a coil.

(b) Inductance and its Q-value.

(c) Very small resistance.

(d) Capacitance and its power factor.

Answer: (d) Capacitance and its power factor.

7. Schering bridge is suitable for measurement of

(a) Q of a coil.

(b) L of a coil.

(c) capacitance.

(d) dissipation factor.

Answer: (d) dissipation factor.

8. Dissipation factor, tan δ, of a capacitor measured by which bridge?

(a) Anderson bridge.

(b) Hay bridge.

(c) Schering bridge.

(d) Wien bridge.

Answer: (c) Schering bridge.

9. The dielectric loss of a capacitor can be measured by which one of

the following?

(a) Wien bridge.

(c) Schering bridge.

(b) Owen bridge.

(d) Maxwell bridge.

Answer: (c) Schering bridge.

10. The imperfect capacitance which is shunted by a resistance can be measured by which one of the following ?

(a) Carey Foster bridge.

(b) Owen bridge

(c) Schering bridge.

(d) Wien bridge.

Answer: (c) Schering bridge.

11. Which one of the following bridges is used for measurement of dielectric loss and power factor of a capacitor ?

(a) Maxwell's bridge.

(b) Anderson bridge.

(c) De Sanity's bridge.

(d) Schering bridge.

Answer: (d) Schering bridge.

12. Which of the following is used to measure the leakage resistance of a capacitor ?

(a) Megger.

(b) Schering bridge.

(c) Potentiometer.

(d) Loss of charge method.

Answer: (b) Schering bridge.

13. The capacitance and loss angle of a given capacitor specimen are best measured by

(a) Wheatstone bridge.

(b) Maxwell bridge.

(c) Anderson bridge.

(d) Schering bridge.

Answer: (d) Schering bridge.

14. AC bridges

(a) have leakage error and eddy current errors only.

(b) have residual errors, frequency errors and waveform errors only.

(c) both (a) and (b).

(d) are free from errors.

Answer: (c) both (a) and (b).

15. Wagner Earth devices in ac bridge circuits are used for

(a) Shielding all the bridge elements from external magnetic field.

(b) Eliminating the effect of stray capacitance.

(c) Minimizing the effect of intercomponent capacitance.

(d) Eliminating all the node to earth capacitances.

Answer: (d) Eliminating all the node to earth capacitances.

16. What should be the main characteristic(s) of the null detector in a bridge measurement ?

1. Accuracy.

2. Precision.

3. Sensitivity.

4. Resolution.

Select the correct answer using the code given below : Code :

(a) Only 1 and 2.

(b) Only 2 and 3.

(c) Only 3 and 4.

(d) Only 3.

Answer: (d) Only 3.

17. Which of the following factors decide the accuracy in a bridge measurement ?

1. Accuracy of the null indicator.

2. Accuracy of the bridge components.

3. Sensitivity of the null indicator.

4. Applied voltage to the bridge system.

Select the correct answer using the code given below

(a) 1 and 2.

(b) 2 and 3.

(c) 3 and 4.

(d) 1 and 3.

Answer: (c) 3 and 4.

18. A bridge circuit works at a frequency of 2 kHz. Which detector can be used for detecting the null conditions in the bridge ?

(a) Vibration galvanometer and head phones.

(b) Head phones and tunable amplifiers.

(c) Vibration galvanometer and tunable amplifiers.

(d) Vibration galvanometer, head phones and tunable amplifiers.

Answer: (b) Head phones and tunable amplifiers.

19. Vibration galvanometers, tunable amplifiers and head phones are used in

(a) dc bridges.

(b) ac bridges.

(c) both dc and ac bridges.

(d) Kelvin double bridge.

Answer: (b) ac bridges.

20. In the loop tests performed for localizing the earth fault in cables the fault resistance

(a) affects the balance conditions.

(b) affects the sensitivity of the bridge.

(c) affects the value of cable resistance.

(d) all of the above.

Answer: (b) affects the sensitivity of the bridge.

21. Permeameters are essentially pieces of apparatus constructed for testing of

(a) magnetic specimens in the form of bars.

(b) magnetic specimens in the form of rings.

(c) magnetic specimens both in the form of bars and rings.

(d) none of the above.

 Answer: (a) magnetic specimens in the form of bars.

22. Ballistic tests are used in magnetic measurements for determination of

(a) B-H curve of a specimen.

(b) hysteresis loop of a specimen.

(c) flux density, magnetic force of B-H curve and hysteresis loop of the specimen.

(d) finding out losses in the specimen.

Answer: (c) flux density, magnetic force of B-H curve and hysteresis loop of the specimen.

23. Iron losses in a magnetic specimen can be measured by using

(a) Campbell bridge method.

(b) Anderson bridge method.

(c) Hay bridge method.

(d) Schering bridge method.

Answer: (a) Campbell bridge method.

24. Sphere gap is used for measurement of

(a) peak value of radio frequency voltage.

 (b) insulation resistance in capacitance divider.

(c) peak value of power frequency voltages.

(d) fast rising transient voltage.

Answer: (c) peak value of power frequency voltages.

25. Impulse voltages are characterized by

(a) polarity.

(b) peak value.

(c) time of half the peak value.

(d) all of the above.

Answer: (d) all of the above.

26. Which of the following statements about impulse voltage is true ?

(a) An impulse voltage is a unidirectional voltage.

(b) In chopped impulse voltage, flash-over does not occur.

(c) Time taken to rise is exactly equal to the time taken to fall.

(d) RMS value of impulse voltage is always less than 50% of average value.

Answer: (a) An impulse voltage is a unidirectional voltage.

27. The insulating oil, fit for use, should withstand

(a) at least 20 kV for two minutes.

(b) at least 40 kV for one minute.

(c) at least 100 kV for one minute.

(d) at least 200 kV for half minute.

Answer: (b) at least 40 kV for one minute.

28. A Schering bridge used for testing of a porcelain insulator should be shielded by a metallic screen so that

(a) no crack develops in the insulator during testing.

(b) Earth's magnetic field does not affect it.

(c) it is safe for the operator.

(d) external electrostatic field does not affect it.

Answer: (d) external electrostatic field does not affect it.

29. The sensitivity of a photodiode depends upon

(a) light intensity and depletion region width.

(b) depletion region width and excess carrier life time.

(c) excess carrier life time and forward bias current.

(d) forward bias current and light intensity.

Answer: (a) light intensity and depletion region width.

30. A photocell is illuminated by a small-bright source placed 1 m away. When the same source of light is placed 2 m away, the electrons emitted by the photocathode

(a) each carry one-quarter of their previous energy.

(b) each carry one-quarter of their previous moments.

(c) are half as numerous.

(d) are one quarter as numerous.

Answer: (d) are one quarter as numerous.

31. Which one of the following statements is correct ? An electronic voltmeter is more reliable as compared to multimeter for measuring voltages across low impedance because

(a) its sensitivity is high.

(b) it offers high input impedance.

(c) it does not alter the measured voltage.

(d) its sensitivity and input impedance are high and do not alter the measured value.

Answer: (d) its sensitivity and input impedance are high and do not alter the measured value.

32. The essential elements of an electronic instrument is a/an

(a) transducer.

(b) signal conditioner.

(c) indicating device.

(d) all of the above.

Answer: (c) indicating device.

33. Electronic voltmeter provides more accurate readings in high resistance circuits as compared to non-electronic voltmeter because of its

(a) high V/ohm ratings.

(b) high ohm/V ratings.

(c) low meter resistance.

(d) high resolution.

Answer: (b) high ohm/V ratings.

34. An advantage which a VTVM has over a non-electronic voltmeter is

(a) low power consumption.

(b) low input impedance.

(c) the ability to measure wider ranges of voltage and resistance.

(d) greater portability.

Answer: (a) low power consumption.

35. VTVM can be used to measure

(a) dc voltage.

(b) ac voltage of high frequency.

(c) dc voltage and ac voltage upto the order of 5 MHz frequency.

(d) ac voltage of low frequency.

Answer: (c) dc voltage and ac voltage upto the order of 5 MHz frequency.

36. Which of the following are the advantages of a balanced bridge vacuum tube voltmeter in comparison with a conventional VTVM?

1. Higher input impedance.

2. Effect of changes due to variation in valve characteristics is minimized.

3. Power supply fluctuations have less effect on measurement.

Select the correct answer using the code given below :

(a) 1 and 2.

(b) 2 and 3.

(c) 2 and 3.

(d) 1, 2 and 3.

Answer: (d) 1, 2 and 3.

36. A dc VTVM can be used for measuring voltages of frequency up to about 250 MHz with the help of

(a) rectifier.

(b) RF probe.

(c) RC circuit.

(d) LC circuit.

Answer: (b) RF probe.

38. In modem electronic multimeters, a FET or MOSFET is preferred over BJT, because

(a) its input resistance is high.

(b) its input resistance is high and does not vary with the change of range.

(c) its input resistance is low.

(d) it is cheaper.

Answer: (a) its input resistance is high.

39. The function of input attenuators in measuring instruments like VTVM, CRO etc. is to

(a) increase the input impedance.

(b) attenuate the frequency range.

(c) attenuate the input signal amplitude without altering the frequency contents.

(d) attenuate the input impedance.

Answer: (c) attenuate the input signal amplitude without altering the frequency contents.

40. The effective value of a complex waveform should be measured with a voltmeter which responds to

(a) peak.

(b) true rms.

(c) average.

(d) peak-to-peak value.

Answer: (b) true rms.

41. Chopper stabilized dc amplifier type electronic voltmeter overcomes the effect of

(a) Amplifier CMRR.

(b) Amplifier sensitivity.

(c) Amplifier drift.

(d) Electromagnetic interference.

Answer: (c) Amplifier drift.

42. True rms responding voltmeters use

(a) thermistors.

(b) RTDs.

(c) LVDTs.

(d) thermocouples.

Answer: (d) thermocouples.

43. Measuring and balancing thermocouples are used in a

(a) peak responding voltmeter.

(b) peak-to-peak responding voltmeter.

(c) average responding voltmeter.

(d) rms responding voltmeter.

Answer: (d) rms responding voltmeter.

44. An analogue electronic circuit that measures rms value of the input voltage by averaging the square of the instantaneous voltage level, responds slowly to the changes in the input signal due to

(a) the "square" function built into the circuit.

(b) the "square-root" function built into the circuit.

(c) the averaging function built into the circuit.

(d) none of the above.

Answer: (c) the averaging function built into the circuit.

45. In an electronic ohmmeter an op-amp is used as a

(a) summer.

(b) multiplier.

(c) buffer amplifier.

(d) integrator.

Answer: (c) buffer amplifier.

46. Electronic null detectors are

(a) less sensitive.

(b) more sensitive.

(c) more expensive.

(d) of excellent sensitivity, rugged construction and fairly expensive.

Answer: (d) of excellent sensitivity, rugged construction and fairly expensive.

47. Which one of the following multirange voltmeters has high and constant input impedance ?

(a) PMMC voltmeter.

(b) Electronic voltmeter.

(c) Moving iron voltmeter.

(d) Dynamometer type voltmeter.

Answer: (b) Electronic voltmeter.

48. Which one of the following is basically a current sensitive instrument?

(a) PMMC instrument.

(b) CRO.

(c) Electrostatic instrument.

(d) FET input electronic voltmeter.

Answer: (a) PMMC instrument.

49. A voltage in the range of 0 - 10 mV with an output resistance of 1 MΩ can be measured by a meter of type

(a) thermal.

(b) moving iron.

(c) PMMC.

(d) electronic.

Answer: (d) electronic.

50. Which amplifier is used in an electronic multimeter ?

(a) Power amplifier.

(b) Buffer amplifier.

(c) Differential amplifier.

(d) Wideband amplifier.

Answer: (c) Differential amplifier.

51. Modern electronic multimeters measure resistance by

(a) using a bridge circuit.

(b) using an electronic bridge compensator for nulling.

(c) forcing a constant current and measuring the voltage across the unknown resistor.

(d) applying a constant voltage and measuring the current through the unknown resistor.

Answer: (c) forcing a constant current and measuring the voltage across the unknown resistor.

52. A multimeter is used for the measurement of the following :

1. Both ac and dc voltage.

2. Both ac and dc current.

3. Resistance.

4. Frequency.

5. Power.

Select the correct answer using the codes given

(a) 1, 2 and 4.

(b) 1, 2, and 5.

(c) 1, 3 and 5.

(d) 1, 2 and 3.

Answer: (d) 1, 2 and 3.

53. A symmetrical square wave voltage is read on an average response electronic voltmeter whose scale is calibrated in terms of rms value of a sinusoidal wave. The error in the reading is

(a) - 3.9%

(b) + 3.9%

(c) -11%

(d) + 11%

Answer: (d) + 11%

54. Consider the following statements:

1. Amplifier gain and phase shift.

2. Filter transfer functions.

3. Two port network parameters.

4. Power gain in a two port circuit.

Which of the above quantities can be measured using a vector voltmeter?

(a) 1 and 3 only.

(b) 1, 2 and 4.

(c) 1, 2 and 3.

(d) 3 and 4.

Answer: (c) 1, 2 and 3.

55. The Q-meter works on the principle of
(a) mutual inductance.

(b) self inductance.

(c) series resonance.

(d) parallel resonance.

Answer: (c) series resonance.

56. Consider the following statements regarding the sources of error in a Q-meter.
1. If a coil with a resistance R is connected in the direct measurement mode and if the residual resistance of Q-meter is 0.1 R, then the measured Q of the coil would be 1.1 times the actual Q.

2. If the inductance to be measured is less than 0.1 µH, the error due to presence of residual inductance cannot be neglected.

3. The presence of distributed capacitance in a coil modifies the effective Q of the coil.

Of these statements

(a) 1, 2 and 3 are correct.

(b) 1 and 2 are correct.

(c) 2 and 3 are correct.

(d) 1 and 3 are correct.

Answer: (c) 2 and 3 are correct.

57. In measurements made using a Q-meter, high impedance elements should preferably be connected in

(a) star.

(b) delta.

(c) series.

(d) parallel.

Answer: (d) parallel.

58. If the Q-factor of a coil is measured by varying the frequency, then

(a) the plot between Q and frequency is linear.

(b) the value of Q initially decreases with increase of frequency and afterwards it will increase with increase of frequency.

(c) the value of Q initially increases with increase of frequency and afterwards it will decrease with increase of frequency.

(d) the Q-factor remains constant irrespective of the frequency.

Answer: (a) the plot between Q and frequency is linear.

59. Oscilloscope is basically a

(a) voltmeter.

(b) ammeter.

(c) wattmeter.

(d) energy meter.

Answer: (a) voltmeter.

60. Beam of electrons in a cathode ray tube eminates because of

(a) secondary emission.

(b) thermionic emission.

(c) diffusion.

(d) post acceleration.

Answer: (b) thermionic emission.

61. What is the approximate input impedance of a CRO ?

(a) Zero

(b) 1 MΩ

(c) 10 Ω

(d) 10 μΩ

Answer: (b) 1 MΩ

62. Which one of the following measuring devices has minimum loading effect on the quantity under measurement ?

(a) PMMC.

(b) CRO.

(c) Hot wire.

(d) Electrodynamometer.

Answer: (b) CRO.

63. In CRT aquadag carries

(a) aqueous solution of graphite.

(b) sweep voltage.

(c) secondary emission electrons.

(d) none of the above.

Answer: (a) aqueous solution of graphite.

64. The purpose of providing acquadag in CRT is to

(a) increase fluorescence.

(b) increase phosphorescence.

(c) protect burning of screen.

(d) remove electrostatic charge accumulation.

Answer: (d) remove electrostatic charge accumulation.

65. The Miller sweep circuit normally used in a CRO is basically

(a) a voltage to current converter circuit.

(b) a current to voltage converter circuit.

(c) an integrator circuit.

(d) a differentiator circuit.

Answer: (c) an integrator circuit.

66. In a CRO, the time-base generators supply ramp voltage to

(a) horizontal deflecting plates.

(b) vertical deflecting plates.

(c) both horizontal and vertical deflecting plates.

(d) none of the above.

Answer: (a) horizontal deflecting plates.

67. In a CRT the highest positive potential is given to

(a) focusing electrodes.

(b) cathode

(c) vertical deflection plates.

(d) post deflection acceleration anode.

Answer: (d) post deflection acceleration anode.

68. Post-deflection is required in CRO, if input signal frequency is

(a) less than 1 kHz.

(b) less than 1 MHz.

(c) below 10 MHz.

(d) above 10 MHz.

Answer: (d) above 10 MHz.

69. In a CRO astigmatism is

(a) a source of generating fast electrons.

(b) a medium for absorbing secondary emission electrons.

(c) an additional focus control.

(d) a time-delay control in the vertical deflection system.

Answer: (c) an additional focus control.

70. The purpose of the synchronizing control in a CRO is to

(a) focus the spot on the screen.

(b) lock the display of signal.

(c) adjust the amplitude of display.

(d) control the intensity of the spot.

Answer: (b) lock the display of signal.

71. It is desired to make accurate measurement of voltage using a CRO. Which of the following items should be taken into consideration in this measurement ?

1. Electrostatic deflection type CRT.

2. Magnetic deflection type CRT.

3. Small deflection for measurement at the center of the screen.

4. Large deflection to cover the entire screen.

Select the correct answer using the code given below :

(a) 1 and 4.

(b) 2 and 3.

(c) 2 and 4.

(d) 1 and 3.

Answer: (a) 1 and 4.

72. Which one of the following statements correctly represents the post acceleration in a CRT ?

(a) It provides deflection of the beam.

(b) It increases the brightness of the trace if the signal frequency is higher than 10 MHz.

(c) It accelerates the beam before deflection.

(d) It increases the brightness of the trace of low frequency signal.

Answer: (b) It increases the brightness of the trace if the signal frequency is higher than 10 MHz.

73. Lissajous pattern obtained on the screen of a CRO can be used to determine

(a) phase shift.

(b) amplitude distortion.

(c) voltage amplitude.

(d) none of the above.

Answer: (a) phase shift.

74. The X and Y inputs of a CRO are respectively V sin ωt and -V sin ωt. The resulting Lissajous pattern will be

(a) a straight line.

(b) a circle.

(c) an ellipse.

(d) a figure of eight.

Answer: (a) a straight line.

75. The sine wave output of a function generator is fed to both the horizontal (X) and vertical (Y) inputs of a CRO. What will be the pattern on the cathode ray screen ?

(a) A circle.

(b) An ellipse.

(c) A straight line with 45° slope.

(d) Sinusoidal.

Answer: (c) A straight line with 45° slope.

76. Two in-phase, 50 Hz sinusoidal waveforms of unit amplitude are fed into channel 1 and channel 2 respectively of an oscilloscope. Assuming that the voltage scale, time scale and other settings are exactly the same for both the channels, what would be observed if the oscilloscope is operated in X - Y mode ?

(a) A circle of unit radius.

(b) An ellipse.

(c) A parabola.

(d) A straight line inclined at 45° with respect to the x-axis.

Answer: (d) A straight line inclined at 45° with respect to the x-axis.

77. Which of the following measurements can be made using Lissajous figures ?

1. Frequency

2. Phase difference

3. Time interval between pulses.

4. Pulse width.

5. Fundamental and higher harmonic components. Select the correct answer using the code given below :

(a) 1 and 2

(b) 2 and 3

(c) 3 and 4

(d) 4 and 5

Answer: (a) 1 and 2