Electrical and Electronics Measurement MCQ 3

1. A CRO screen has 10 divisions on the horizontal scale. If a voltage signal 5 sin (314 t + 45°) is examined with a line base setting of 5 ms/division, the number of cycles of signal displayed on the screen will be

(a) 0.5 cycle

(b) 2.5 cycles

(c) 5 cycles.

(d) 10 cycles.

Answer: (b) 2.5 cycles

2. A non-triggered oscilloscope

(a) has a continuously running time-base generator.

(b) has no sweep generator.

(c) cannot produce a stable stationary screen display.

(d) can display a portion of the input signal waveform.

Answer: (a) has a continuously running time-base generator.

3. The oscilloscope has an input capacitance of 50 pF and a resistance of 2 MΩ and the voltage divider ratio (k) of 10. What are the parameters of a high-impedance probe?

(a) C_1 = 5.55 pF and R_1 = 9 MΩ.

(b) C_1 = 5.55 pF and R_1 = 18 MΩ

(c)C_1 = 3.33 pF and R_1 = 9 MΩ

(d) C_1 = 1.11 pF and R_1 = 18 MΩ

Answer: (b) C_1 = 5.55 pF and R_1 = 18 MΩ

4. In a dual beam oscilloscope

(a) there are two separate vertical inputs and two separate horizontal inputs.

(b) there are two separate vertical inputs and there is only one set of horizontal deflection plates.

(c) there is only one vertical input but there are two separate horizontal deflection plates.

(d) there is only one vertical and one horizontal input.

Answer: (b) there are two separate vertical inputs and there is only one set of horizontal deflection plates.

5. A dual trace oscilloscope is set to operate in the alternate mode. The control input of the multiplexer used in the y-circuit fed with a signal having a frequency equal to

(a) the highest frequency that the multiplexer can operate properly.

(b) twice the frequency of the time base (sweep) oscillator.

(c) the frequency of the time bate (sweep) oscillator.

(d) half the frequency of the time base (sweep) oscillator.

Answer: (d) half the frequency of the time base (sweep) oscillator.

6. Which of the following statements is NOT correct for a storage type oscilloscope ?

(a) The storage target is a conductive mesh covered with magnesium fluoride.

(b) Secondary emission electrons etch a positively charged pattern.

(c) The flood guns used for display, emit high velocity electrons. (d) The flood guns are placed between the deflection plates and storage target.

Answer: (c) The flood guns used for display, emit high velocity electrons.

7. If the transients during switching of power supply are to be studied, which oscilloscope will be preferred ?

(a) An ordinary oscilloscope with high frequency sweep generator.

(b) Dual beam oscilloscope.

(c) Dual trace oscilloscope.

(d) Storage oscilloscope.

Answer: (d) Storage oscilloscope.

8. Which of the following A/D converter is used in a Digital Storage Oscilloscope (DSO) ?

(a) Ramp type.

(b) Successive approximation type.

(c) Dual slope type.

(d) Parallel type.

Answer: (a) Ramp type.

9. A single channel digital storage oscilloscope uses a 12 bit, 10^8 samples per second ADC. For a 10 kHz sine wave input, what is the number of samples taken per cycle of input ?

(a) 10^{12}

(b) 10^8

(c) 10^4

(d) 10^2

Answer: (c) 10^4

10. A single channel digital storage oscilloscope uses a 10 bit 10^7 samples per second analog-to-digital converter. For a 100 kHz sine wave input, the number of samples taken per cycle of the input will be

(a) 10^7

(b) 10^4

(c) 10^3

(d) 10^2

Answer: (d) 10^2

11. Sampling oscilloscopes are specially designed to measure

(a) very low frequency.

(b) very high frequency.

(c) microwave frequency.

(d) none of the above.

Answer: (b) very high frequency.

12. In dc coupling mode, CRO can measure

(a) ac voltage only.

(b) dc voltage only.

(c) both ac and dc voltages.

Answer: (c) both ac and dc voltages.

13. The best method for testing waveforms of a TV receiver is to use an oscilloscope with

(a) open test leads.

(b) a shielded test cable.

(c) a low capacitance probe.

(d) none of the above.

Answer: (b) a shielded test cable.

14. Which one of the following is the correct statement ? Active probe used in a CRO

(a) is bulkier than passive ones.

(b) cannot measure small signals.

(c) cannot couple high frequency signals.

(d) can attenuate more.

Answer: (a) is bulkier than passive ones.

15. A compensated probe of a CRO contains which of the following

1. An amplifier

2. R-C network

3. Only resistive network .

4. Only capacitive network

Select the correct answer using the code given below :

(a) 1 and 2 only.

(b) 2 only.

(c) 3 only.

(d) 4 only.

Answer: (d) 4 only.

16. If the bandwidth of an oscilloscope is given as direct current to 10 MHz, what is the fastest rise time a sine wave can have to be produced accurately by the oscilloscope?

(a) 35 nsec.

(b) 10 nsec.

(c) 3.5 nsec.

(d) 0.035 nsec.

Answer: (a) 35 nsec.

17. In distortion factor meter, the filter is used to suppress

(a) dc component.

(b) odd harmonics.

(c) even harmonics

(d) fundamentals.

Answer: (d) fundamentals.

18. The level range of harmonic analyzer using crystal filter is from

(a) - 90 dB to 32 dB

(b) 20 dB to 10 dB

(c) 40 dB to 90 dB

(d) 90 dB to 180 dB

Answer: (a) - 90 dB to 32 dB

19. A wave analyzer is basically a superheterodyne receiver covering the following range of frequency with an IF of 100 kHz.

(a) 20 Hz to 50 kHz

(b) 100 kHz to 1 MHz

(c) 5 MHz to 5 GHz

(d) 100 kHz to 100 GHz

Answer: (b) 100 kHz to 1 MHz

20. Spectrum analyzer is a combination of

(a) narrowband superheterodyne receiver and CRO.

(b) signal generator and CRO.

(c) oscillator and wave analyzer.

(d) VTVM and CRO.

Answer: (a) narrowband superheterodyne receiver and CRO.

21. Which one of the following truly represents the output on the screen of spectrum analyzer when an amplitude modulated wave is connected to it ?

(a) Single vertical lines on the screen.

(b) Two vertical lines on the screen.

(c) Three vertical lines with amplitude.

(d) Three vertical lines out of which two have equal magnitude.

Answer: (d) Three vertical lines out of which two have equal magnitude.

22. The dynamic range of a spectrum analyzer with a third order incept point of + 25 dB and a noise level of - 85 dB is

(a) 110 dB

(b) - 60 dB

(c) + 25 dB

(d) 73 dB

Answer: (a) 110 dB

23. Which of the following units are present in a spectrum analyzer?

1. Mixer. 2. Sawtooth generator. 3. Local oscillator.

Select the correct answer using the codes given below: Codes:

(a) 1, 2 and 3.

(b) 1 and 2.

(c) 1 and 3.

(d) 2 and 3.

Answer: (a) 1, 2 and 3.

24. The harmonic distortion percentage is accurately measured by

(a) VTVM.

(b) CRO.

(c) harmonic distortion analyzer.

(d) VOM.

Answer: (c) harmonic distortion analyzer.

25. Which of the following instruments are useful in measuring the signal levels of individual harmonics in an unknown waveform?

1. Distortion analyzer

2. Wave analyzer

3. Spectrum analyzer

Select the correct answer using the codes given below: Codes :

(a) 1 and 2.

(b) 2 and 3.

(c) 1 and 3.

(d) 1, 2 and 3.

Answer: (b) 2 and 3.

26. The highly selective fixed frequency filters are used in a

(a) resonant wave analyzer.

(b) heterodyne wave analyzer.

(c) distortion analyzer.

(d) Q-meter.

Answer: (a) resonant wave analyzer.

27. The study of energy distribution across the frequency spectrum of a given electrical signal is done by a

(a) distortion meter.

(b) wave analyzer.

(c) spectrum analyzer.

(d) Q-meter.

Answer: (c) spectrum analyzer.

28. Which of the following electronic instruments (or equipment) can be used to measure correctly the fundamental frequency component of a waveform and its higher harmonics ?

1. CRO.

2. VTVM.

3. Spectrum analyzer.

4. Distortion factor meter.

Select the correct answer from the codes given below:

(a) 1 and 2.

(b) 2 and 3.

(c) 3 and 4.

(d) 1 and 4.

Answer: (c) 3 and 4.

29. Consider the following statements:

1. The main drawback of digital system is that the real world is mainly analog.

2. The major advantage of digital instruments over analog instruments is higher accuracy and better resolution.

3. Digital instruments are ordinarily used for the measurement of both analog and digital quantities.

Which of the above statements is/are correct?

(a) 1, 2 and 3.

(b) 1 and 3 only.

(c) 2 only.

(d) 1 and 2 only.

Answer: (a) 1, 2 and 3.

30. A DVM measures

(a) peak value.

(b) rms value.

(c) peak-to-peak value.

(d) average value.

Answer: (d) average value.

31. Accuracy of DVM is specified as

(a) percentage of the actual reading.

(b) percentage of the full-scale reading.

(c) number of least significant digits.

(d) all of these.

Answer: (b) percentage of the full-scale reading.

32. The following statements are related to a DVM. Which of them is true ?

(a) Common mode rejection is the same for ac and dc voltages.

(b) Its accuracy depends on source impedance.

(c) It does not have series mode error.

(d) Use of shunts for dc current measurements increases its accuracy.

Answer: (a) Common mode rejection is the same for ac and dc voltages.

33. The circuit generally used in digital instruments to convert sine waves into rectangular pulses is a

(a) sawtooth generator.

(b) differential amplifier.

(c) sample and hold circuit.

(d) Schmitt trigger.

Answer: (d) Schmitt trigger.

34. Integrating principle in the digital measurement is the conversion of

(a) voltage to time.

(b) voltage to frequency.

(c) voltage to current.

(d) current to voltage.

Answer: (b) voltage to frequency.

35. Which one of the following decides the precision of integrating digital voltmeter?

(a) Reference voltage of analog comparator.

(b) Slope of the generated ramp.

(c) Width of the generated pulses.

(d) Electronic counter.

Answer: (a) Reference voltage of analog comparator.

36. Which one of the following is not true of digital instruments ?

(a) Loading of the circuit under measurement is less.

(b) Accuracy is better.

(c) Free from observational errors.

(d) Can present the reading in overall context of range.

Answer: (d) Can present the reading in overall context of range.

37. The conversion of a voltage value to a time interval is carried out by comparing the unknown voltage with a voltage ramp in a

(a) ramp type DVM.

(b) integrating type DVM.

(c) continuous type DVM.

(d) successive approximation type DVM.

Answer: (a) ramp type DVM.

38. An integrating DVM measures

(a) peak value of input voltage.

(b) rms value of input voltage.

(c) true average of the input voltage.

(d) variance of the input voltage.

Answer: (c) true average of the input voltage.

39. Consider the following elements :

1. Buffer. 2. Differentiator. 3. Integrator. 4. Comparator.

Which of the above is/are components in a dual slope integrating type voltmeter ?

(a) 1, 3 and 4.

(b) 1 and 2.

(c) 3 and 4.

(d) 2 only.

Answer: (a) 1, 3 and 4.

40. Consider the following statements: The A to D converter used in a digital instrument could be

1. Successive approximation converter type.

2. Flash converter type.

3. Dual slope converter type.

The correct sequence in the increasing order of the conversion time taken by these types is

(a) 1, 2 and 3.

(b) 2, 1 and 3.

(c) 1, 3 and 2.

(d) 2, 3 and 1.

Answer: (b) 2, 1 and 3.

41. The precision of a ramp type digital voltmeter depends on

(a) frequency of the generator and slope of the ramp.

(b) frequency of the generator.

(c) slope of the ramp.

(d) switching time of the gate.

Answer: (a) frequency of the generator and slope of the ramp.

42. Which one of the following digital voltmeters is most suitable to eliminate the effect of period noise ?

(a) ramp type digital voltmeter.

(b) integrating type digital voltmeter.

(c) successive approximation type digital voltmeter.

(d) servo type digital voltmeter.

Answer: (d) servo type digital voltmeter.

43. A DVM has

(a) no auto ranging facility and no overload protection.

(b) a resolution of 1 part in 10^6.

(c) an input resistance of 1 MΩ and an input capacitance of 1μF

(d) an accuracy of about ± 2%.

Answer: (b) a resolution of 1 part in 10^6.

44. To eliminate 50 Hz pick-up in a dual slope DVM, the minimum period of integration of the input signal is

(a) 1 ms

(b) 20 ms

(c) 1 s

(d) 100 s

Answer: (c) 1 s

45. An average-reading digital multimeter reads 10 V when fed with a triangular wave, symmetric about the time-axis. For the same input an rms-reading meter will read

(a) 20/√3

(b) 10/√3

(c) 20√3

(d) 10√3

Answer: (a) 20/√3

46. What is the range for a 3 - 1/2 digit digital voltmeter ?

(a) 0 to 1999

(b) 0 to 1500

(c) 0 to 999

(d) 0 to 19999

Answer: (a) 0 to 1999

47. In a digital voltmeter, the oscillator frequency is 400 kHz. The ramp voltage falls from 8 V to 0 V in 20 ms. What is number of pulses counted by the counter?

(a) 8,000

(b) 4,000

(c) 3,200

(d) 1,600

Answer: (a) 8,000

48. In a digital voltmeter, 'over-ranging' implies that

(a) the next four digits are switched-on.

(b) 1/2 digit is switched off.

(c) 1/2 digit is switched on.

(d) an over-range indicator starts glowing.

Answer: (c) 1/2 digit is switched on.