Electrical and Electronics Measurement MCQ 2

1. Commonly used standard capacitor is

(a) concentric sphere type.

(b) parallel plate type.

(c) concentric cylinder type with guard ring.

(d) multiple parallel plate type.

Answer: (c) concentric cylinder type with guard ring.

2. Which one of the following meters is an integrating type instrument?

(a) Ammeter.

(b) Voltmeter.

(c) Wattmeter.

(d) Energy meter.

Answer: (d) Energy meter.

3. The …….. is an integrating type instrument:

(a) moving iron ammeter

(b) moving coil voltmeter.

(c) dynamometer wattmeter.

(d) induction type energy meter.

Answer: (d) induction type energy meter.

4. Industrial measuring instruments are of accuracy classes

(a) 0.5 and 1.

(b) 0.5, 1, 1.5, 2.5 and 5.

(c) 1, 1.5, 2.5 and 5.

(d) 1.0, 0.2 and 0.5.

Answer: (c) 1, 1.5, 2.5 and 5.

5. The most suitable material for use as spring material for most of the applications, except in low resistance instruments, is

(a) platinum silver.

(b) phosphor-bronze.

(c) silicon bronze.

(d) hard-rolled silver.

Answer: (b) phosphor-bronze.

6. Ideally, the damping torque should be

(a) proportional to the velocity of moving system and operating current.

(b) proportional to the velocity of the moving system but independent of operating current.

(c) independent of the velocity of the moving system and proportional to the operating current.

(d) independent of the velocity of the moving system and operating current.

Answer: (b) proportional to the velocity of the moving system but independent of operating current.

7. To achieve the optimum transient response, the indicating instruments are so designed as to

(a) be critically damped.

(b) be undamped.

(c) providing damping which is slightly more than the critical value.

(d) providing damping which is slightly less than the critical value.

Answer: (d) providing damping which is slightly less than the critical value.

8. The damping torque must operate only when the moving system of the indicating instrument is

(a) actually moving.

(b) stationary.

(c) just starting to move.

(d) near its full deflection.

Answer: (a) actually moving.

9. In eddy current damping systems, the disc employed should be of

(a) conducting and magnetic material.

(b) conducting but nonmagnetic material.

(c) magnetic but non-conducting material.

(d) non-conducting and nonmagnetic material.

Answer: (b) conducting but nonmagnetic material.

10. For a sensitive galvanometer, the type of support used is

(a) suspension.

(b) taut suspension.

(c) unipivot suspension.

(d) none of these.

Answer: (a) suspension.

11. Preferred material for permanent magnet is

(a) stainless steel.

(b) alnico.

(c) tungsten steel.

(d) soft iron.

Answer: (b) alnico.

12. Due to which one of the following reasons bearings of PMMC instrument are made of Jewel ?

(a) To avoid wear and tear of the moving system.

(b) To provide a small support.

(c) It can be easily replaced.

(d) To make the system robust.

Answer: (a) To avoid wear and tear of the moving system.

13. What is the 'swamping' resistance which is connected in series with the working coil of a voltmeter to drastically reduce the error in measurement caused due to variation in temperature; made of ?

(a) Constantan.

(b) Eureka.

(c) Manganin.

(d) Nichrome.

Answer: (c) Manganin.

14. The galvanometer is protected during transport by

(a) connecting critical damping resistance across the galvanometer terminals.

(b) shorting the galvanometer terminals.

(c) keeping the galvanometer terminals open-circuited.

(d) a capacitor across the galvanometer terminals.

Answer: (a) connecting critical damping resistance across the galvanometer terminals.

15. The response of a galvanometer is independent of its

(a) controlling torque.

(b) number of turns.

(c) circuit resistance.

(d) none of these.

Answer: (c) circuit resistance.

16. The reflecting mirror mounted on the moving coil of a vibration galvanometer is replaced by a bigger size mirror. This will result in

(a) lower frequency of resonance and lower amplitude of vibration.

(b) lower frequency of resonance but the amplitude of vibration is unchanged.

(c) higher frequency of resonance and lower amplitude of vibration.

(d) higher frequency of response but the amplitude of vibration is unchanged.

Answer: (a) lower frequency of resonance and lower amplitude of vibration.

17. In a ballistic galvanometer, the inertia of the moving system is large so that

(a) it is practically stationary during the period the electricity is passing through the coil.

(b) it is accelerating fast as soon as the coil is energized.

(c) the amplitude of oscillations is small.

(d) the frequency of oscillation is large.

Answer: (a) it is practically stationary during the period the electricity is passing through the coil.

18. Why is damping of a ballistic galvanometer kept small ?

(a) To get minimum overshoot.

(b) To make the system critically damped.

(c) To make the system ocsiliatory.

(d) To get first deflection large.

Answer: (d) To get first deflection large.

19. A PMMC instrument can be used as a flux meter by

(a) using a low resistance shunt.

(b) removing the control springs.

(c) making the control springs of large moment of inertia.

(d) using a high series resistance.

Answer: (b) removing the control springs.

20. Flux meter is a special type of ballistic galvanometer provided with which one of the following ?

(a) Heavy electromagnetic damping and very small controlling torque.

(b) Heavy electromagnetic damping and large controlling torque.

(c) Small electromagnetic damping and controlling torque.

(d) Large controlling torque and small electromagnetic damping.

Answer: (a) Heavy electromagnetic damping and very small controlling torque.

21. In a flux meter, the controlling torque is

(a) produced by weight attached to the moving coil.

(b) produced by spring.

(c) not provided at all.

(d) provided by crossed-coil mechanism.

Answer: (c) not provided at all.

22. What is connected across a flux meter for its effective functioning to measure magnetic flux density and also to compare the strengths of permanent magnets ?

(a) A resistor.

(b) A capacitor.

(c) A transformer.

(d) A search coil.

Answer: (a) A resistor.

23. Analog panel meters basically measure.

(a) voltage.

(b) current.

(c) power.

(d) depends upon parameter.

Answer: (d) depends upon parameter.

24. Consider the following statements : In a measuring instrument,

1. linearity is more important than sensitivity.

2. high precision indicates high accuracy.

3. accuracy cannot be better than resolution.

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: (a) 1, 2 and 3 are correct.

25. A moving coil galvanometer is made into a dc ammeter by connecting

(a) a low resistance across the meter.

(b) a high resistance in series with the meter.

(c) a pure inductance across the meter.

(d) a capacitor in series with the meter.

Answer: (a) a low resistance across the meter.

26. Consider the following statements about the D'Arsonval movement :

1. It is best suited for dc current measurement.

2. It responds to the average value of current.

3. It measures the rms value of ac currents.

4. It could be used for power measurements.

Which of these statements is/are correct ?

(a) Only 1.

(b) 1 and 2.

(c) 2 and 3.

(d) 1, 2, 3 and 4.

Answer: (b) 1 and 2.

27. The internal resistance of the milli-ammeter must be very low for

(a) high sensitivity.

(b) high accuracy.

(c) maximum voltage drop across the meter.

(d) minimum effect on the current in the circuit.

Answer: (d) minimum effect on the current in the circuit.

28. A very accurate voltmeter gives inaccurate reading when used for measuring voltage across a low resistance because

(a) the meter sensitivity is too low.

(b) the meter sensitivity is too high.

(c) the voltmeter is taking too low current.

(d) the higher scale has been selected.

Answer: (a) the meter sensitivity is too low.

29. The effect of stray magnetic fields on the actuating torque of a portable instrument is maximum when the operating field of the instrument and the stray fields are

(a) perpendicular.

(b) parallel.

(c) inclined at 60°.

(d) inclined at 30°.

Answer: (b) parallel.

30. Which one of the following statements is correct ? Spiral springs are used in instruments to

(a) provide controlling torque.

(b) provide damping torque.

(c) lead the current to moving coil as well as to provide the controlling torque.

(d) provide linear deflection.

Answer: (c) lead the current to moving coil as well as to provide the controlling torque.

31. If the instrument has square law response, it can be used for the measurement of

(a) ac only.

(b) both ac and dc.

(c) dc only.

(d) none of the above.

Answer: (b) both ac and dc.

32. A manganin swamp resistance is connected in series with a moving coil ammeter consisting of a milli-ammeter and a suitable shunt in order to

(a) minimize the effect of temperature variation.

(b) obtain large deflecting torque.

(c) reduce the size of the meter.

(d) minimize the effect of stray magnetic fields.

Answer: (a) minimize the effect of temperature variation.

33. Consider the following statements associated with moving iron instruments:

1. These can be used in dc as well as ac circuits.

2. The scale is non-uniform.

3. The moving iron is placed in a field of permanent magnet.

Which of these statements are correct ?

(a) 1, 2 and 3.

(b) 1 and 2.

(c) 2 and 3.

(d) 1 and 3.

Answer: (b) 1 and 2.

34. Eddy current damping cannot be used for moving iron instruments because

(a) weight of the instrument will increase.

(b) size of the instrument will increase.

(c) presence of permanent magnet will distort the magnetic field produced by the instrument and hence will affect its readings.

(d) eddy currents will pass through the iron thereby cause losses.

Answer: (c) presence of permanent magnet will distort the magnetic field produced by the instrument and hence will affect its readings.

35. The moving iron instruments

(a) indicate the same values of measurand for both ascending and descending values.

(b) indicate higher value of measurand for descending values.

(c) indicate lower value of measurand for ascending values.

(d) may indicate any of the higher or lower value of measurand for ascending or descending values.

Answer: (b) indicate higher value of measurand for descending values.

36. Hysteresis error, in moving iron instruments, may be reduced by using

(a) mumetal or permalloy.

(b) stainless steel.

(c) silver coating.

(d) high speed steel.

Answer: (a) mumetal or permalloy.

37. An unshielded moving iron voltmeter is used to measure the voltage in an ac circuit. If a stray dc magnetic field having a component along the axis of the meter coil appears, the meter reading would be

(a) unaffected.

(b) decreased.

(c) increased.

(d) either decreased or increased depending oil the direction of the dc field.

Answer: (d) either decreased or increased depending oil the direction of the dc field.

38. A spring-controlled moving iron voltmeter draws a current of 1 mA for full-scale value of 100 V. If it draws a current of 0.5 mA, the meter reading is

(a) 25 V

(b) 50 V

(c) 100 V

(d) 200 V

Answer: (a) 25 V

39. One of the control springs of a permanent magnet moving coil ammeter is broken. If connected in a circuit, the meter would read

(a) zero.

(b) half the correct value of the current.

(c) twice the correct value of the current.

(d) an indefinite figure.

Answer: (a) zero.

40. A 0 - 10 A PMMC ammeter is not provided with any controlling mechanism and the moving parts are free to rotate. If a current of 1 A dc is passed through the moving coil the instrument

(a) will read 1 A.

(b) will read 10 A.

(c) pointer will continuously rotate.

(d) pointer will remain stationary.

Answer: (b) will read 10 A.

41. An advantage of a PMMC instrument is that it is

(a) free from friction error.

(b) has high (torque/weight of the moving parts) ratio.

(c) has low (torque/weight of the moving parts) ratio.

(d) can be used on both ac and dc.

Answer: (b) has high (torque/weight of the moving parts) ratio.

42. The term artificial aging in instrument is associated with

(a) springs.

(b) permanent magnets.

(c) controlling torques.

(d) damping.

Answer: (b) permanent magnets.

43. Moving iron and PMMC instruments can be distinguished from each other by looking at

(a) pointer.

(b) terminal size.

(c) scale.

(d) scale range.

Answer: (c) scale.

44. The disadvantage of PMMC instrument is

(a) high power consumption.

(b) high cost relative to moving iron instruments.

(c) low torque/weight ratio.

(d) absence of effective and efficient eddy current damping.

Answer: (b) high cost relative to moving iron instruments.

45. A high frequency ac signal is applied to a PMMC instrument. If the rms value of ac signal is 2V, the reading of the instrument will be

(a) zero.

(b) 2 V.

(c) 2 .5 V

(d) 4 V.

Answer: (a) zero.

46. In a PMMC instrument, if the control spring is replaced by another one having a higher spring constant, then the natural frequency and damping ratio will

(a) decrease.

(b) increase and decrease respectively.

(c) decrease and increase respectively.

(d) increase.

Answer: (b) increase and decrease respectively.

47. A sinusoidal voltage of 1 V_{rms} value at 10 Hz is applied across the two terminals of a PMMC type of voltmeter. What is the deflection of the pointer ?

(a) zero volt.

(b) 1 V

(c) √2 V

(d) The pointer oscillates around zero volt.

Answer: (d) The pointer oscillates around zero volt.

48. Which of the following factors limit the deflection of the pointer of a PMMC instrument of about 90° ?

1. Its damping mechanism.

2. Linearity of the magnetic field in which the coil moves.

3. Control spring arrangement.

4. Shape of the pole shoe of the horseshoe magnet.

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

(a) Only 1 and 3.

(b) Only 2 and 4.

(c) Only 2 and 3.

(d) Only 1 and 4.

Answer: (b) Only 2 and 4.

49. In a PMMC instrument, the central spring stiffness and the strength of the magnet decreases by 0.04% and 0.02% respectively due to a rise in temperature by 1°C. With a rise in temperature of 10°C, the instrument reading will

(a) increase by 0.2%.

(b) decrease by 0.2%.

(c) increase by 0.6%.

(d) decrease by 0.6%.

Answer: (a) increase by 0.2%.

50. A PMMC type ammeter and a moving iron type ammeter are connected in series in a resistive circuit fed from output of a half wave rectifier voltage source. If the moving iron type reads 5A, the PMMC type instrument is likely to read

(a) zero

(b) 2.5 A

(c) 3.18 A

(d) 5 A

Answer: (c) 3.18 A

51. The scale of a dynamometer type instrument marked in terms of rms value would be

(a) uniform throughout.

(b) non-uniform crowded near full scale.

(c) non-uniform crowded at the beginning.

(d) non-uniform crowded around midscale.

Answer: (c) non-uniform crowded at the beginning.

52. In an electrodynamometer type instrument an astatic movement is provided in order to

(a) eliminate error owing to stray magnetic fields.

(b) provide damping torque.

(c) increase the instrument operating torque.

(d) eliminate temperature error.

Answer: (a) eliminate error owing to stray magnetic fields.

53. In a dynamometer type moving coil instrument a swamping resistance is provided in order to

(a) control the deflecting torque.

(b) reduce the bulk of the moving system.

(c) reduce the current flowing through the moving coil.

(d) provide equal time constant for moving coil and fixed coil, when used for ac measurement.

Answer: (d) provide equal time constant for moving coil and fixed coil, when used for ac measurement.

54. Which one of the following statements is correct ? The deflection of hot-wire instrument depends on

(a) rms value of the ac current.

(b) rms value of the ac voltage.

(c) average value of the ac current.

(d) average value of the ac voltage.

Answer: (a) rms value of the ac current.

55. Consider the following statements about hot-wire instruments:

1. They read equally well on dc and/or ac circuits.

2. They are simple and robust in construction and power consumption is low.

3. They are quite suitable for measurement of currents at very high frequencies.

Which of the above statements are correct?

(a) and 2 only.

(b) 2 and 3 only.

(c) 1 and 3 only.

(d) 1, 2, 3 and 4.

Answer: (c) 1 and 3 only.

56. Which of the following statements is not correct for thermocouple measuring instruments ?

(a) They are very useful as transfer instruments.

(b) They are incapable of taking any overload.

(c) Power losses are very low.

(d) Their calibration does not change with time or temperature.

Answer: (c) Power losses are very low.

57. Which of the following are the characteristics of a thermocouple type of indicating instrument ?

1. Its accuracy is very high, as high as about 1 percent.

2. It has a linear scale because a D'Arsonval movement is used for measuring the output.

3. It is an RF instrument and can be used for frequency up to about 50 MHz.

4. It cannot be damaged by overloads.

Select the correct answer from the codes given below.

(a) 1 and 2.

(b) 2 and 3.

(c) 3 and 4.

(d) 1 and 3.

Answer: (d) 1 and 3.

58. Consider the following statements in respect of the thermoelectric instruments.

1. They indicate the rms value of current or voltage.

2. They suffer from waveform errors.

3. They can be used for frequency ranges of the order of MHz.

4. They have a low overload capacity.

Which of these statements are correct ?

(a) 1, 3, 4.

(b) 1, 2 and 4.

(c) 1, 2 and 3.

(d) 2, 3 and 4.

Answer: (a) 1, 3, 4.

59. Rectifier moving coil instruments respond to

(a) peak value, irrespective of the nature of the waveform.

(b) average value, for all waveforms.

(c) rms value for all waveforms.

(d) rms value, for symmetrical square waveforms.

Answer: (b) average value, for all waveforms.

60. An ac voltmeter using full-wave rectification and having a sinusoidal input has an ac sensitivity equal to

(a) 1.414 times dc sensitivity.

(b) dc sensitivity.

(c) 0.9 times dc sensitivity.

(d) 0.707 times dc sensitivity.

Answer: (c) 0.9 times dc sensitivity.

61. A rectifier instrument is used to measure an alternating square wave of amplitude 100 V. What is the meter reading ?

(a) 100 V

(b) 70.7 V

(c) 111 V

(d) None of the above.

Answer: (a) 100 V

62. Which of the following meters does not exhibit square law response?

(a) Moving coil

(b) Moving iron.

(c) Electrodynamometer.

(d) Hot wire instrument.

Answer: (a) Moving coil

63. Which one of the following instruments is commonly used to measure primary current of a transformer connected to mains ?

(a) Electrostatic meter.

(b) Current transformer.

(c) Moving coil type meter.

(d) Moving iron meter.

Answer: (d) Moving iron meter.

64. For a given frequency, the deflecting torque of an induction ammeter is directly proportional to

(a) current^2.

(b) current^3.

(c) √current.

(d) current.

Answer: (a) current^2.

65. Induction type instruments are not usually used as ammeters and voltmeters because

(a) their indications are affected by stray magnetic field considerably.

(b) variation in supply frequency and temperature may cause serious errors unless compensating device is used.

(c) these instruments are costlier and consume more power in comparison to other instruments.

(d) both (b) and (c).

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

66. Decibel scale is useful while measuring voltages covering

(a) wide frequency ratio.

(b) wide voltage ratio.

(c) narrow frequency range.

(d) narrow voltage range.

Answer: (a) wide frequency ratio.

67. Error due to hysteresis is predominant in

(a) moving coil instruments.

(b) moving iron instruments.

(c) hot-wire instruments.

(d) electrodynamometer instruments.

Answer: (b) moving iron instruments.

68. To measure currents in the MHz range, we use instrument of

(a) moving iron type.

(b) thermocouple type.

(c) electrodynamometer type.

(d) rectifier type.

Answer: (b) thermocouple type.

69. Which one of the following types of instruments can be used to determine the rms values of ac voltage of high magnitude (10kV) and of any wave shape ?

(a) Moving iron instruments.

(b) Dynamometer type instruments.

(c) Induction instruments.

(d) Electrostatic instruments.

Answer: (d) Electrostatic instruments.