Unit II

Part (a) ELECTROSTATICS

1. A dielectric material must be_____
a. resistor
b. Insulator
c. Conductor
d. Semiconductor
ans:b

2. The energy stored in capacitance is given by_____
a. C^2V
b. $CV^2/2$
c. $C^2V/2$
d. CV
ans:b

3. Electrolytic capacitors can be used for_____
a. a.c. only
b. d.c. only
c. both a.c. and d.c.
d. 50 Hz a.c.
ans:b

4. If two 10 µF capacitors are connected in parallel, then the effective capacitance will be_____
a.2.5 µF
b.40 µF
c.0.4 µF
d.20 µF
ans:d

5. If a number of capacitors are connected in series then the total capacitance of combination is_____
a. greater than the capacitance of largest capacitor
b. greater than the capacitance of any capacitor
c. smaller than the capacitance of smallest capacitor
d. average of the capacitance of all capacitor
ans:c

6.The total capacitance of five capacitor each of 10 µF in series is_____
a.10 µF
b.2 µF
c.25 µF
d. none of these
ans:b

7. Two capacitors of capacitance C_1=0.1 µF and C_2=0.2 µF are connected in series across 300V source. The voltages across C1 will be_____
a. 100 V
b. 200 V
c. 150 V
d. 300 V
ans:b

8. A capacitor stores 0.4C charge at 2 V. Its capacitance is_____
a. 0.4 F
b. 0.2 F
c. 3.2 F
d. 0.8 F
ans:b

9. A20mF capacitor is in series with a 150 ohm resistor. The combination is placed across a 40V dc source. Time constant of the circuit is_____
a. 8 s
b. 3 s
c. 6 s

d. 2.4s
ans: b

10. Three capacitors of values 3 µF, 6 µF, and 12 µF are connected in parallel across an a.c. source. The maximum current pass through _____
a.3 µF
b.6 µF
c.12 µF
d. all the capacitors
ans:c

11.As per Coulomb's law_____
a. $F= Q_1Q_2 / \varepsilon_o\varepsilon_r d^2$
b. $F= Q_1Q_2 / 4\pi d^2$
c. $F= Q_1Q_2 / 4\pi \varepsilon_o\varepsilon_r d^2$
d. $F= Q_1Q_2 /4\pi \varepsilon_o\varepsilon_r d$
ans: c

12. Electric field intensity at any point in an electric field is equal to_____
a. potential gradient
b. $(\text{potential gradient})^2$
c. $(\text{potential gradient})^{1/2}$
d. $(\text{potential gradient})^{1/3}$
ans: a

13. The lines of forces due to isolated charged particle are_____
a. always straight
b. always curved
c. sometimes curved
d. none of the above
ans: a

14. The direction of electric field due to positive charge is___
a. away from the charge
b. towards the charge
c. both (a) and (b)
d. none of the above
ans: a

15. The unit of capacitance is
a. Volts/Coulomb
b. Coulomb/Volt
c. Ohms
d. Henry/Wb
ans: b

16. There is repulsive force between two charged objects when
a. Charges of unlike sign
b. they have the same number of protons
c. charges are of same sign
d. they have the same number of protons
ans: c

17. The capacitance of a capacitor is not affected by
a. distance between plates
b. area of plates
c. thickness of plates
d. all of the above
ans: c

18. When there is an equal amount of positive and negative charges on an object the object is
a. Positively charged
b. negatively charged
c. neutral
d. supercharged
ans:c

19. Which of the following statements is correct?
a. Air capacitors have a black band to indicate the outside foil
b. Electrolytic capacitor must be connected in the correct polarity
c. Ceramic capacitors must be connected in the correct polarity

d. Mica capacitors are available in capacitance value of 1 to 10 μF
ans: b

20. Three capacitors each of the capacity C are given. The resultant capacity 2/3 C can be obtained by using them
a. all in series
b. all in parallel
c. two in parallel and third in series with this combination
d. two in series and third in parallel across this combination.
ans:c

21. For which of the following parameter variation, the capacitance of the capacitor remains unaffected?
a. Distance between plates
b. Area of the plates
c. Nature of dielectric
d. Thickness of the plates
ans: d

22. Which of the following expression is correct for electric field strength?
a. $E = D/\epsilon$
b. $E = D^2/\epsilon$
c. $E = \pi D$
d. $E = \pi D^2$
ans: a

23. Which of the following statement is true?
a. The current in the discharging capacitor grows linearly
b. The current in the discharging capacitor grows exponentially
c. The current in the discharging capacitor decays exponentially
d. The current in the discharging capacitor decreases constantly
ans:c

24. In a capacitor the electric charge is deposited on
a. metal plates
b. dielectric
c. both (a) and (b)
d. none of the above
ans:a

25. Which of the following materials has the highest value of dielectric constant?
a. Glass
b. Vaccum
c. Ceramics
d. Oil
ans: c

26. Capacitance of air capacitor increases with
a. increase in plate area and decrease in distance between the plates
b. increase in plate area and distance between the plates
c. decrease in plate area and value of applied voltage
d. reduction in plate area and distance between the plates
ans: a

27. A capacitor consists of
a. two insulators separated by a conductor
b. two conductor separated by a dielectric
c. two insulators only
d. two conductors only
ans:b

28. A paper capacitor is usually available in the form of
a. tubes
b. rolled foil
c. disc
d. meshed plates
ans:b

29. Air capacitors are generally available in the range
a. 10 to 400 pF
b. 1 to 20 pF
c. 100 to 900 pF
d. 20 to 100 pF
ans:a

30. The unit of capacitance is
a. Henry
b. Ohm
c. Farad
d. Farad/m
ans:c

31. A capacitor charged to 200V has 2000 μC of charge. The value of capacitance will be
a. 10 F
b. 10 μF
c. 100 μF
d. 1000 μF
ans:b

32. Voltage across capacitor at any time't' during charging from a D.C. source of voltage V is given by
a. $v = Ve^{-t/\lambda}$
b. $v = V(1-e^{-t/\lambda})$
c. $v = V^2e^{-t/\lambda}$
d. $v = V^2(1-e^{-t/\lambda})$
ans:b

33. The ratio of electric flux density to electric field intensity is called ……. of the medium
a. permeability
b. permittivity
c. reluctance
d. capacitance
ans:b

34. Energy stored in the electrical field of a capacitor C when charged from a D.C, source of voltage V is equal to …….. Joule
a. ½ CV^2
b. ½ C^2V
c. CV^2
d. C^2V
ans:a

35. The absolute permittivity of free space is given by
a. 8.854×10^{-9} F/m
b. 8.854×10^{-10} F/m
c. 8.854×10^{-11} F/m
d. 8.854×10^{-12} F/m
ans:d

36. The relative permittivity of free space is given by
a. 1
b. 10
c. 100
d. 1000
ans:a

37. When 4 Volt e.m.f. is applied across a 1 Farad capacitor, it will store energy of
a. 2 Joule
b. 4 Joule
c. 6 Joule
d. 8 Joule
ans:d

38. The capacitor preferred for high frequency circuits is
a. air capacitor
b. mica capacitor
c. electrolytic capacitor
d. paper capacitor
ans:b

39. If a 6μF capacitor is charged to 200 V the charge in Coulomb will be_____
a. 800 μC
b. 900 μC
c. 1200 μC
d. 1600 μC
ans:c

40. Which of the following capacitors is marked for polarity_____?
a. air
b. paper
c. mica
d. electrolyte
ans: d

41. Which of the following capacitor are usually used for radio frequency tuning_____
a. air
b. paper
c. mica
d. electrolyte
ans: b

42. The time constant of an R-C circuit is defined as the time during which capacitor charging voltage actually rises to ---------- percent of its ---------- value
a.37, initial
b.63.2, initial
c.63.2, final
d.37, final
ans: c

43. The time constant of an R-C circuit is defined as the time during which capacitor charging current actually falls to ---------- percent of its initial maximum value
a.37
b.63
c.42
d.73
ans: a

44. Permittivity is expressed in_____
a. Farad/sq-m
b. weber/metre
c. Farad/meter
d. weber/ square metre
ans:c

45. Dielectric strength of a material depends on_____
a. moisture content
b. temperature
c. thickness
d. all of the above
ans: d

46. 1 Volt /metre is same as
a. 1 metre/coulomb
b. 1 Newton metre
c. 1 Newton /Coulomb
d. 1 Joule /Coulomb
ans: c

47. The relative permittivity of air is_____
a.0
b.1.0006
c. 8.854×10^{-12}
d. none of the above
ans:b

48. The relative permittivity of a material is 10. Its absolute permittivity will be
a. $8.854 \times 10^{-11} F/M$
b. $9 \times 10^{8} F/M$
c. $5 \times 10^{-5} F/M$
d. $9 \times 10^{5} F/M$
ans: a

49. The capacitance of a capacitor is …… relative permittivity

a. directly proportional to
b. inversely proportional to
c. independent of
d. directly proportional to square of
ans: a

50. An air capacitor has the same dimensions that of a mica capacitor. If the capacitance of mica capacitor is 6 times that of air capacitor, then relative permittivity of mica is
a. 36
b. 12
c. 3
d. 6
ans: d

51. The most convenient way of achieving large capacitance is by using
a. multiplate construction
b. decreased distance between plates
c. air as dielectric
d. dielectric of low permittivity
ans: a

52. Two capacitors of capacitance C_1 and C_2 are connected in parallel. A charge Q given to them is shared. The ratio of charges Q_1/Q_2 is
a. C_2/ C_1
b. C_1/ C_2
c. $C_1 C_2$
d. $1/ C_1 C_2$
ans: b

53. Two capacitors have capacitance 25 µF when in parallel and 6 µF when in series. Their individual capacitances are
a. 12 µF and 13 µF
b. 15 µF and 10 µF
c. 10 µF and 8 µF
d. none of the above
ans:b

54. If the dielectric of a capacitor is replaced by a conducting material the
a. capacitor will get heated up owing to eddy currents
b. plates will get short-circuited
c. capacitor can store infinite charge
d. capacitance will become very high
ans:b

55. The total capacitance of two condensers is .03µF when joined in series and 0.16µF when connected in parallel. The products of two capacitance will be_____
a.5.33
b.2
c.3
d.0.48
ans:d

56. Joule / Coulomb is the unit of
a. Electric field potential
b. Potential
c. charge
d. none of the above.
ans:b

57 .A 10µF capacitor in series with an 1 M Ohm resistor is connected across a100 V d. c. supply. Determine the time constant of the circuit
a. 10 sec.
b. 0.1 sec
c. 10mSec
d. 100 Sec
ans:a

58. A 10µF capacitor in series with an 1 M Ohm resistor is connected across a100 V d. c. supply. Determine the initial value of charging current.
a. 1mA
b. 0.1 mA
c. 0.01mA
d. 1.00A

ans:b

59. A 10µF capacitor in series with an 1 M Ohm resistor is connected across a100 V d. c. supply. Determine the initial rate of rise of voltage across the capacitor.
a. 0.1V/s
b. 10V/s
c. 0.01V/s
d. 1V/s
ans:b

60. A 10µF capacitor in series with an 1 M Ohm resistor is connected across a100 V d. c. supply. Determine the capacitor voltage after a time equal to the time constant.
a.36V
b.36.6V
c.63.2V
d.63 V
ans:c

61. A 10µF capacitor in series with an 1 M Ohm resistor is connected across a100 V d. c. supply. Determine the voltage across the capacitor 3sec. after switch on.
a.25.92V
b.259.2V
c.2.592V
d.25V
ans:a

62. A fully charged capacitor of 10µF has a potential difference of 100V across its terminals. It is discharged through 1 KΩ resistor. Find Initial discharging current.
a.1A
b.10A
c.0.01A
d.0.1A
ans:d

63. A fully charged capacitor of 10µF has a potential difference of 100V across its terminals. It is discharged through 1 K Ohm resistor. Find discharging current at 2m Sec.
a. - 0.0818A
b. - 0.01A
c. - 0.00818A
d. - 1A
ans:a

64. A fully charged capacitor of 10µF has a potential difference of 100V across its terminals. It is discharged through 1 K Ohm resistor. Find initial rate of fall in voltage across capacitor.
a. 10^4 V/s
b. -10^4 V/s
c. -1^4 V/s
d. 10A
ans:b

65. A fully charged capacitor of 10µF has a potential difference of 100V across its terminals. It is discharged through 1 K Ohm resistor. Find time constant of the circuit.
a. 0.1sec
b. 1sec
c. 0.01sec
d. 0.001sec
ans:c

66. A capacitor consists of two similar plates each 10cm x 10cm mounted parallel and opposite to each other. What is the value of capacitance when distance between them is 1cm and dielectric used is air.
a. 8.854 pF
b. 8.854 µF
c. 8.854 mF
d. 8.854 F
ans: a

67. The capacitance of capacitor formed by two parallel plates each 200 cm^2 in area separated by dielectric of 4mm thick is 0.0004μF. If voltage of 20000 V is applied then the total charge on the plate is
a. 8μC
b. 8mC
c. 8nC
d. 8pC
ans: a

68. A parallel plate capacitor has plate area of $2m^2$ spaced by three slabs of dielectric materials. The relative permittivity's are 2,3 and 6 respectively and thickness are 0.4mm, 0.6mm and 0.12 mm respectively. Find the combined capacitance.
a. 0.000295 x 10-6 F
b. 0.00295 x 10-6 F
c. 0.0295 x 10-6 F
d. 0. 295 x 10-6 F
ans: b

69. What is the unit of charge?
a. Volt-Amp
b. Henery
c. Farad
d. Coulomb
ans: d

70. What will be the capacitance of four capacitors of equal capacitance 'C' when connected in parallel
a. 4C
b. C/4
c. 3C/4
d. C
ans: a

71. A region around a stationary electric charge has
a. magnetic field
b. electric field
c. magnetic field and electric field
d. neither magnetic field nor electric field
ans: b

72. One Farad is the same as
a. One Coulomb/Volt
b. One Joule/Coulomb
c. One Joule/Volt
d. One Coulomb /Joule
ans: a

73 . If Q be the charge and C be the capacitance then the energy stored in the capacitor is
a. 1/2QC
b. 1/QC
c. $Q^2/2C$
d. Q/2C
ans: c

74.What capacitance must be placed in series with a 15μF capacitor to give a total capacitance of 5μF
a. 4μF
b. 7.5μF
c. 10μF
d. 25μF
ans: b

75. One Coulomb charge equals the charge on
a. 6.42×10^{18} electrons
b. 6.24×10^{18} atoms
c 6.24×10^{12}electrons
d. none of these
ans: a

76. The capacitance of parallel plate capacitor is given as
a. $C = \epsilon_0 A / d$
b. $C = \epsilon_0 d / A$

c. $C = \frac{\epsilon_o \epsilon_r A}{d}$

d. $C = \epsilon_r A / d$

ans: c

77. Two capacitors of 2 μF and 4 μF are connected in parallel across 100 V D.C. supply. Determine (i) Energy stored on each capacitor

a. 0. 1 J and 0. 2 J

b. 0.01 J and 0.02 J

c 1 J and 2 J

d. 0.001 J and 0.002 J

ans: b

78. The capacitance composit capacitor is given as

a. $C = \frac{\epsilon_o A}{\frac{d_1}{\epsilon_{r_1}} + \frac{d_2}{\epsilon_{r_2}} + \frac{d_3}{\epsilon_{r_3}}}$

b. $C = \epsilon_0 d / A$

c. $C = \frac{\epsilon_o \epsilon_r A}{d}$

d. $C = \epsilon_r A / d$

ans: a

79. The plate area of a parallel-plate capacitor is 0.01 sq. m. The distance between the plates is 2.5 cm. The insulating medium is air. Find its capacitance.

a 3.54×10^{-12} F

b. 35.4×10^{-12} F

c 3.54×10^{-10} F

d. 3.54×10^{-11} F

ans: a

80. The plate area of a parallel-plate capacitor is 0.01 sq. m. The distance between the plates is 2.5 cm. What would be its capacitance, if the space between the plates is filled with an insulating material of relative permittivity 5?

a 177.1×10^{-12} F

b. 1.771×10^{-12} F

c . 17.71×10^{-10} F

d. 17.71×10^{-12} F

ans: d

81.A parallel-plate capacitor has two plates each of area 2.5 m2 separated by three dielectric materials of thickness 1, 2 and 3 mm and relative permittivity's of 2, 4 and 8 respectively. Calculate (i) the capacitance of the capacitor

a. 1.60 x 10-8 F

b. 1.60 x 10-10 F

c. 1.60 x 10-12 F

d. 1.60 x 10-9 F

ans: a

Unit II

Part (b) AC FUNDAMENTALS

1. A standard sinusoidal voltage wave changes its polarity at_____
a. maximum value
b. minimum value
c. zero value
d. none of the above
ans:c

2. The period of a certain sine wave is 10 milliseconds. Its frequency is_____
a.10 MHz
b.10 KHz
c.10 Hz
d.100 Hz
ans:d

3. Two sine waves are said to be in phase with each other if they achieve their_____
a. zero value at the same time
b. maximum value at the time
c. minimum value at the same time
d. all of the above
ans:d

4. The distance occupied by one complete cycle of the wave is called its_____
a. time period
b. wavelength
c. velocity
d. frequency
ans:a

5. The rms value of a sine wave of peak value I_m is given by_____
a. $I_m/\sqrt{2}$
b. I_m
c. $I_m/2$
d. I_m/π
ans:a

6.The average value of a sine wave of maximum value I_m over one cycle is_____
a. I_m/π
b. $2I_m/\pi$
c. zero
d. $I_m/2$
ans:c

7. The rms value of a sine wave of maximum value 10A equals a dc current of _____ampere.
a.7.07
b.6.37
c.5
d.5.77
ans:a

8.The rms value of a sinusoidal voltage with peak-to-peak value of 240 V is_____V.
a.84.84
b.77.82
c.94.68
d.89.15
ans:a

9. The time period of a sinusoidal waveform with 200 Hz frequency is_____second.
a.0.05
b.0.005
c.0.0005
d.0.5
ans:b

10. The peak value of a sine wave is 400 V. Its average value is_____
a.254.6 V

b.282.6 V
c.400 V
d.565.5 V
ans:a

11. The form factor of a sine wave is_____
a.1.01
b.1.11
c.1.21
d. none of the above
ans:b

12. A current is said to be alternating when it changes in_____
a. magnitude only
b. direction only
c. both magnitude and direction
d. neither magnitude nor direction
ans:c

13. An alternating current of 50 Hz frequency and 100 A maximum value is given by_____
a.$i = 200\ sin628t$
b.$i = 100\ sin314t$
c.$i = 100\sqrt{2}\ sin314t$
d.$i = 100\sqrt{2}\ sin157t$
ans:b

14. An alternating current of 50 Hz frequency has a maximum value of 100 A. Its value 1/600 second after the instant current is zero will be_____
a. 25 A
b. 12.5 A
c. 50 A
d. 75 A
ans:c

15.A sinusoidal voltage varies from zero to a maximum of 250 V. The voltage at the instant of 60° of the cycle will be_____
a. 150 V
b. 216.5 V
c. 125 V
d.108.25 V
ans:b

16. An alternating current is given by the expression $i = 200\sin(314t + \frac{\pi}{3})$ amperes. The maximum value and frequency of the current are_____
a. 200 A, 50 Hz
b. 100√2, 50 Hz
c. 200 A, 100 Hz
d. 200 A, 25 Hz
ans:a

17.The average value of the current $i = 200\sin t$ from $t = 0$ to $t = \frac{\pi}{2}$ is _____
a. 400 π
b. $\frac{400}{\pi}$
c.$\frac{1}{400}$
d.$\frac{\pi}{400}$
ans:b

18. When two quantities are in quadrature, the phase angles between them will be_____
a.45°
b.90°
c.135°
d.60°
ans:b

19.The alternating voltage $e = 200\sin 314t$ is applied to a device which offers an ohmic resistance of 20 Ω to the flow of current in one direction while entirely preventing the flow in the opposite direction. The average value of the current will be_____
a.5 A
b.3.18 A

c.1.57 A
d.1.10 A
ans:b

20. The ac system is preferred to dc system because_____
a. ac voltages can be easily changed in magnitude
b. dc motors do not have fine speed control
c. high voltage ac transmission is less efficient
d. dc voltage can not be used for domestic appliances
ans:a

21.In ac system, we generate sine waveform because_____
a. it can be easily drawn
b. it produces least disturbance in electrical circuits
c. it is nature's standard
d. other waves can not be produced easily
ans:b

22._____will work only on dc supply.
a. electric lamp
b. refrigerator
c. electroplating
d. heater
ans:c

23.An alternating voltage is given by $v = 20\sin 157t$. The frequency of the alternating voltage is_____
a.50 Hz
b.25 Hz
c.100 Hz
d.75 Hz
ans:b

24. An alternating current is given by $i = 10\sin 314t$. The time taken to generate two cycles of current is____
a. 0.02 second
b. 0.01 second
c. 0.04 second
d. 0.05 second
ans:c

25. A sine wave has a maximum value of 20 V. Its value at 135° is_____
a. 10 V
b. 14.14 V
c. 15 V
d. 5 V
ans:b

26. An alternating voltage is given by $v = 30\,sin314t$ .The time taken by the voltage to reach 30 V for the first time is_____
a. 0.02 second
b. 0.1 second
c. 0.03 second
d. 0.005 second
ans:d

27. A sinusoidal current has a magnitude of 3 A at 120°. Its maximum value will be_____
a.√3 A
b.$\frac{\sqrt{3}}{2}$ A
c.2√3 A
d. 6 A
ans:c

28. An alternating current is given by $i = 10\,sin314t$. Measuring time from $t = 0$, the time taken by the current to reach +10 V for the second time is_____
a. 0.05 second
b. 0.1 second
c. 0.025 second
d. 0.02 second
ans:c

29. An alternating voltage is given by $v = 100\,sin314t$ volts. Its average value will be_____
a. 70.7 V
b. 50 V
c. 63.7 V
d. 100 V
ans:c

30. An alternating current whose average value is 1 A will produce_____1 A dc under similar conditions.
a. less heat than
b. more heat than
c. the same heat as
d. none of the above
ans:b

31. A sinusoidal alternating current has a maximum value of I_m. Its average value will be_____
a.$\frac{Im}{\pi}$
b. $\frac{Im}{2\pi}$
c. $2\frac{Im}{\pi}$
d.none of the above
ans:c

32. The area of a sinusoidal wave over a half-cycle is_____
a.$max.value \div 2$
b.$2 \times max.value$
c.$max.value \div \pi$
d. $.max.value \div 2\pi$
ans:b

33. An alternating voltage is given by $v = 200\,sin314t$. Its rms value will be_____
a. 100 V
b. 282.8 V
c. 141.4 V
d. 121.4 V
ans:c

34. A sinusoidal voltage is represented as $v = 141.4\sin(314.18t - \frac{\pi}{2})$. Its rms value of voltage, frequency and phase angle are respectively_____
a. 141.42 V, 314.16 Hz, 90°
b. 100 V, 100 Hz, -90°
c. 87.92 V, 56 Hz, 90°
d. 100 V,50 Hz, -90°
ans:d

35. When two sinusoidal waves are 90° out of phase, then_____
a. both have their peak values at the same instant
b. both have their minimum values at the same instant
c. one has its peak value; while the other has zero value
d. none of these
ans:c

36. The direction of current in an ac circuit is_____
a. always in one direction
b. varying from time to time
c. unpredictable
d. from positive to negative
ans:b

37. Consider the sinusoidal waves: $A\sin(\omega t + 30°)$ and $B\sin(\omega t - 60°)$. The phase angle relationship between the two waves_____
a. B-wave lags A-wave by 90°
b. B-wave lags A-wave by 60°
c. B-wave lags A-wave by 30°
d. B-wave and A-wave are in phase
ans:a

38. A sinusoidal voltage is expressed as $v = 20\sin(314.16t + \frac{\pi}{3})$ V. Its frequency and phase angle respectively are_____
a. 314.16 Hz, 60°
b. 60Hz, 60°
c. 50 Hz, 60°
d. 50 Hz, -60°
ans:c

39. A sinusoidal voltage v_1 leads another sinusoidal voltage v_2 by 180°. Then_____
a. voltage v_2 leads voltage v_1 by 180°
b. both voltage have their zero values at the same time
c. both voltages have their peak values at the same time
d. all of the above
ans:d

40.The rms value of an ac sinusoidal current is 10 A. Its peak value is_____
a. 7.07 A
b. 14.14 A
c. 10 A
d. 28.28 A
ans:b

41. If A=10∠45° and B=5∠15°, then the value of A/B will be_____
a. 50∠60°
b. 2∠60°
c. 2∠-30°
d. 2∠30°
ans:d

42. When a phasor is multiplied by –j, it gets rotated through in the counterclockwise direction.
a.90°
b.180°
c.270°
d. none of the above
ans:c

43. The rms value of sinusoidally varying current is_____that of its average value.
a. more than
b. less than
c. same as
d. none of the above
ans:a

44. Alternating voltages and currents are expressed in rms values because_____
a. they can be easily determined
b. calculations become very simple
c. they give comparison with dc
d. none of the above
ans:c

45.The average value of $\sin^2\theta$ over a complete cycle is_____
a. +1
b. -1
c. $\frac{1}{2}$
d. zero
ans:c

46.The average value of sinθ over a complete cycle is_____
a. zero
b. +1
c. -1
d. $\frac{1}{2}$
ans:a

47. An alternating current is given by $i = Im\ sin\theta$. The average value of squared wave of this current over a complete cycle is_____
a. $I^2_m/2$
b. I_m/π
c. $2I_m/\pi$

d. $2I_m$
ans:a

48. The form factor of a sinusoidal wave is_____
a.1.414
b.1.11
c.2
d.1.5
ans:b

49. The filament of a vacuum tube requires 0.4A dc to heat it. The rms value of ac required is_____
a.$0.4 \times \sqrt{2}$ A
b.$0.4 \div 2$ A
c.$0.8 \div \sqrt{2}$ A
d. 0.4 A
ans:d

50. A100 V peak ac is as effective as_____dc.
a. 100 V
b. 50 V
c. 70.7 V
d. none of the above
ans:c

51. The form factor of a _____wave is 1.
a. sinusoidal
b. square
c. triangular
d. sawtooth
ans:b

52. Out of the following _____wave is the peakiest.
a. sinusoidal
b. square
c. rectangualr
d. triangular
ans:d

53. The peak factor of a sine waveform is_____
a.1.11
b.1.414
c.2
d.1.5
ans:b

54.When a 15V square wave is connected across a 50V ac voltmeter, it will read_____
a.15V
b.$15 \times \sqrt{2}$ V
c.$15/\sqrt{2}$ V
d.none of the above
ans:a

55.A sine wave has a frequency of 50 Hz. Its angular frequency is_____radian/second.
a.100π
b.50π
c.25π
d.5π
ans:a

56. The period of a wave is_____
a. the same as frequency
b. time required to complete one cycle
c. expressed in amperes
d. none of the above
ans:b

57. The form factor is the ratio of _____
a. peak value to rms value
b. rms value to average value
c. average value to rms value
d. none of the above
ans:b

58. The period of a sine wave is 1/50 seconds. Its frequency is_____
a. 20 Hz

b. 30 Hz
c. 40 Hz
d. 50 HZ
ans:d

59. An ac current is given by $i = 200\ sin100\pi t$. It will achieve a value of 100A after_____second.
a.$\frac{1}{900}$
b.$\frac{1}{800}$
c.$\frac{1}{700}$
d.$\frac{1}{600}$
ans:d

60. A heater is rated as 230V, 10KW, AC. The value of 230V refers to_____
a. average voltage
b. rms voltage
c. peak voltage
d. none of the above
ans:b

61. The peak value of a sine wave is 200V. Its average value is_____
a.127.4V
b.141.4V
c.282.8V
d.200V
ans:a

62. The rms value of a sine wave is 100A. Its peak value is _____
a.70.7A
b.141.4A
c.150A
d.282.8A
ans:b

63. The voltage of domestic supply is 220V. This figure represents_____
a. mean value
b. rms value
c. peak value
d. average value
ans:b

64. The rms value and mean value is the same in the case of_____
a. traingular wave
b. sine wave
c. square wave
d. half wave rectified sine wave
ans:c

65. For the same peak value which of the following wave will have the highest rms value?
a.square wave
b.half wave rectified sine wave
c.triangular wave
d.sine wave
ans:a

66. For the same peak value which of the following wave will have the least mean value?
a. half wave rectified sine wave
b. triangular wave
c. sine wave
d. square wave
ans:a

67. For a sine wave with peak value I_{max}, the rms value is_____
a. $0.5I_{max}$
b. $0.707I_{max}$
c. $0.9I_{max}$
d. $1.414I_{max}$
ans:b

68. Form factor is the ratio of_____
a. average value/rms value
b. average value/peak value
c. rms value/average value

d. rms value/peak value
ans:c

68. For a sine wave with peak value E_{max}, the average value is_____
a. 0.636 E_{max}
b. 0.707E_{max}
c. 0.434 E_{max}
d. 1.414E_{max}
ans:a

69. The current in a circuit is given by: $i = 100 \sin 314t$ amperes. The maximum value and frequency of current are_____
a.50√2 A, 100 Hz
b.100√2 A, 100 Hz
c. 100 A, 50 Hz
d. 70.7 A, 50 Hz
ans:c

70. For a frequency of 200 Hz, the time period will be_____
a. 0.05 S
b. 0.005 S
c. 0.0005 S
d. 0.5 S
ans:b

71. An ac voltage of 50 Hz has a maximum value of 50 V. Its value after 1/600 second after the instant the current is zero will be_____
a.5V
b.12.5V
c.25V
d.43.8V
ans:c

72. For 200V rms value triangular wave, the peak voltage will be_____
a.200V
b.222V
c.282V
d.346V
ans:d

73. A sine wave of voltage varies from zero to maximum of 200V. How much is the voltage at the instant of 30° of the cycle?
a.50V
b.82.8V
c.100V
d.173.2V
ans:c

74. How much rms current does a 300W, 200V bulb take from the 200V, 50 Hz power line?
a.0.5 A
b.1.5 A
c.2 A
d. 3 A
ans:b

75. The rms value of a half-wave rectified current is 100 A. Its value for full-wave rectification would be_____amperes.
a.141.4
b.200
c. 200/π
d. 40/π
ans:a

76. The rms value of a sinusoidal ac current is equal to its value at an angle of _____degrees.
a.90
b.60
c.45
d.30
ans:c

77. The rms value of alternating current is given by steady (dc) current which when flowing through a given circuit for a given time produces_____

a. the more heat than produced by ac when flowing through the same circuit
b. the same heat as produced by ac when flowing through the same circuit
c. the less heat than produced by ac flowing through the same circuit
d. none of the above
ans:b

78. The square waveform of current has following relation between rms value and average value:
a. rms value is equal to average value
b. rms value of current is greater than average value
c. rms value of current is less than average value
d. none of the above
ans:a

79. If a sinusoidal wave has frequency of 50 Hz with 30A rms current, which of the following equation represents the wave?
a.$42.42 \sin 314t$
b.$60\ sin25t$
c.$30 \sin 50t$
d.$84.84\ sin25t$
ans:a

80. Which of the following waves has the highest value of peak factor?
a. square wave
b. sine wave
c. half wave rectified sine wave
d. triangular wave
ans:c

81.The frequency of domestic power supply in India is_____
a. 200 Hz
b. 100 Hz
c. 60 Hz
d. 50 Hz
ans:d

82. The rms value of half wave rectified sine wave is 200V. The rms value of full wave rectified ac will be_____
a.282.8V
b.141.4V
c.111V
d. 100V
ans:a

83. The voltage in a circuit follows the law: $v = 100\ sin\omega t$. If the frequency is 25 Hz, how long will
it take for the voltage to rise to 50V?
a.$\frac{1}{50}$ S
b.$\frac{1}{100}$S
c.$\frac{1}{300}$S
d. $\frac{1}{600}$S
ans:c

84. The negative maximum of a cosine wave occurs at_____
a.30°
b.45°
c.90°
d.180°
ans:d

85. The rms value of pure cosine function is_____
a. 0.5 of peak value
b. 0.707 of peak value
c. same as peak value
d. zero
ans:b

86. An alternating voltage is given in volts by expression $v = 326\ sin314t$. Its rms value and frequency are____
a.230V,50 Hz
b. 230V,100 Hz
c. 326V,50 Hz
d. 326V,100 Hz
ans:a

87. According to which of the alternating current values in the cross sectional area of a conductor with regard to the heating effect is selected?
a. peak value
b. half peak value
c. average value
d. rms value
ans:d

88. The frequency of an alternating current is_____
a. the speed with which the alternator runs
b. the number of cycles generated in one minute
c. the number of waves passing through a point in one second
d. the number of electrons passing through a point in one second
ans:c

89. The equation of 50 Hz current sine wave having rms value of 60 A is_____
a.$60 \sin 25t$
b.$60 \sin 50t$
c.$84.84\ sin314t$
d$42.42\ sin314t$.
ans:c

90. An electric iron designed for 110 V AC supply was rated at 500 W. It was put across a 220 V supply. Assuming that at 110 V, it supplied 500 W output (i.e. no losses) at the new voltage it will supply_____
a. 2500 W
b. 2000 W
c. 500 W
d. 250 W
ans:b

91. The direction of current in an ac circuit_____
a. is from positive to negative
b. is always in one direction
c. varies from instant to instant
d. can not be determined
ans:c

92. The angular frequency of an alternating quantity is a mathematical quantity obtained by multiplying the frequency "f" of the alternating quantity by a factor_____
a.$\frac{\pi}{2}$
b.π
c.2π
d.4π
ans:c

93. The average value of an unsymmetrical alternating quantity is calculated over the_____
a. whole cycle
b. half cycle
c. unsymmetrical part of the waveform
d. first two cycles
ans:a

94. The mean value of the current $i = 20\ sin\theta$ from θ=0 to θ=$\frac{\pi}{2}$ is_____
a.40π
b.$\frac{40}{\pi}$
c.$\frac{1}{40}$

d.$\frac{\pi}{40}$
ans:b

95. A constant current of 2.8A exists in a resistor. The rms value of current is_____
a. 2.8 A
b. about 2 A
c. 1.4 A
d. undefined
ans:a

96. An alternating current is represented as $i = 70.7\sin(520t + \frac{\pi}{6})$. The frequency and rms value of the current are_____
a. 82.76 Hz, 50 A
b. 41.38 Hz, 25 A
c. 41.38 Hz, 50 A
d. 82.76 Hz, 25 A
ans:a

97. The time period or periodic time T of an alternating quantity is the time taken in seconds to complete_____
a. one cycle
b. alternation
c. none of the above
d. Half cycle
ans: a

98. The time period of an alternating quantity is 0.02 second. Its frequency will be_____
a. 25 Hz
b. 50 Hz
c. 100 Hz
d. 0.02 Hz
ans: b

99. An ac current is given as i = 10 + 10 sin 314 t, the average and rms values of the current are____
a. 16.36 A, 17.07 A
b. 10 A, 17.07 A
c. 10 A, 12.25 A
d. 16.36 A, 12.2 A
ans:c

100. The size (cross-sectional area) of a conductor, with regard to the heating effect, is determined on the basis of …….. value of current to be carried by it
a. average value
b. peak value
c. rms value
d. peak to peak value
ans:c

101. The form factor for dc supply voltage is always
a. zero
b. unity
c. infinity
d. any value between 0 and 1
ans:b

102. The _____ varying alternating quantity can be represented as phasor.
a) circular
b) sinusoidally
c) rectangular
d) triagular
ans:b

103. The phasors are assumed to be rotated in _____ direction.
a) clockwise
b) anticlockwise
c) circular
d) all above
ans:b

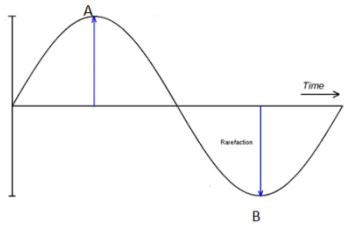
104. In practice, alternating quantities are represented by their _____ values
a. rms

b. average
c. rectangular
d. polar
ans:a

105. Alternating quantities of ____ frequencies can be represented on same phasor diagram.
a. Same
b. Different
c. multiple
d. all above
ans: a

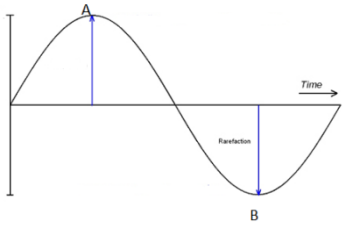
106. The phase of alternating quantity at any particular instant is the fraction of _____
a. phase
b. time
c. time period
d. all above
ans:c

107.



In the above figure, the phase quantity at A is _____
a. T
b. T/2
c. T/3
d. T/4
ans:d

108.



In the above figure, the phase quantity at B is _____
a. T
b.T/2
c.3T/4
d. T/4
ans:c

109. When phase of an alternating quantity is positive it means that quantity has some _____ instantaneous value at t=0
a. zero
b. positive
c. negative
d. none of the above
ans:b

110. When phase of an alternating quantity is negative it means that quantity has some _____ instantaneous value at t=0
a. zero
b. positive
c. negative
d. none of the above
ans:c

111. The difference between the _____ of two alternating quantities is called the phase difference.
a. time
b. phase angle
c. Lengths
d. both a and b
ans:b

112. The difference between the phase of two alternating quantities is called the_____.
a. phase difference
b. sine difference
c. length difference
d. none of the above
ans:a

113. When phase difference between the two alternating quantities is zero, the two quantities are said to be in _____
a. tandom
b. length
c. phase
d. time
ans:c

114. When _____ between the two alternating quantities is zero, the two quantities are said to be in phase.
a. time difference
b. length difference
c. phase difference
d. none of the above
ans:c

115. When phase difference between the two alternating quantities is _____, the two quantities are said to be in phase.
a. one
b. unity
c. zero
d. π/2
ans:c

116. If v = Vm Sin ωt and i = Im Sin (ωt-Φ), the 'i' is said to be _____ 'v' by angle Φ
a. in phase
b. lagging
c. leading
d. all above
ans:b

117. If v = Vm Sin ωt and i = Im Sin (ωt-Φ), the 'v' is said to _____ 'i' by angle Φ
a. in phase
b. lagging
c. leading
d. all above
ans:c

118. If v = Vm Sin ωt and i = Im Sin (ωt+Φ), the 'i' is said to _____ 'v' by angle Φ
a. in phase
b. lagging
c. leading
d. all above
ans:c

119. If v = Vm Sin ωt and i = Im Sin (ωt+Φ), the 'v' is said to _____ 'i' by angle Φ
a. in phase
b. lag
c. lead
d. all above
ans:b

120. If v = Vm Sin ωt and i = Im Sin ωt, the 'i' is said to _____ 'v' by angle Φ
a. in phase
b. lag
c. lead
d. all above
ans:a

121. With respect to reference, plus sign of angle indicates _____
a. leading
b. lagging
c. in phase
d. none of the above
ans:a

122. With respect to reference, minus sign of angle indicates _____

a. leading
b. lagging
c. in phase
d. none of the above
ans:b

123. With respect to reference, _____ sign of angle indicates lead.
a. division
b. plus
c. minus
d.dot
ans:b

124. With respect to reference, _____ sign of angle indicates lag.
a. division
b. plus
c. minus
d.dot
ans:c

125. The diagram in which different sinusoidal alternating quantities of the same frequency, are represented by individual phasors indicating exact phase relationship is called _____
a. graph
b. still diagram
c. phasor diagram
d. picture
ans:c

126. The diagram in which different sinusoidal alternating quantities of the same _____, are represented by individual phasors indicating exact phase relationship is called phasor diagram.
a. time
b. frequency
c. sign
d. shape
ans:b

127. The lagging and leading word is relative to the _____
a. base
b. range
c. reference
d. angle
ans:c

128. Polar form of v = 100 sin(100πt+π/6) Volt is _____
a.61.2371+j35.3553
b.70.7106∟30
c. 61.2371∟35.3553
d. 70.710+ j30
ans:b

129. Rectangular form of V= 100 sin(100πt+π/6) Volt is _____
a.61.2371+j35.3553
b.70.7106∟30
c. 61.2371∟35.3553
d. 70.710+ j30
ans:a

130. RMS value of current I = 25 + j40 Amp is _____
a.57.99
b.47.1699
c.60
d.30
ans:b

131. Two currents $I_1 = 10\angle 50$ and $I_2 = 5\angle -100$ A flow in single phase AC circuit. Then I_1+I_2 = _____
a. 5.5596+ j4.924 A
b. 5.5596∠4.924 A
c. 7.296+ j12.58 A
d. None of the above
ans:a

132. Two currents $I_1 = 10\angle 50$ and $I_2 = 5\angle -100$ A flow in single phase AC circuit. Then I_1-I_2 =_____
a. 5.5596+ j4.924 A
b. 5.5596∟4.924 A
c. 7.296+ j12.58 A
d. None of the above
ans:c

133. Two currents $I_1 = 10\angle 50$ and $I_2 = 5\angle -100$ A flow in single phase AC circuit. Then I_1/I_2 =_____
a. 5.5596+ j4.924 A
b. $2\angle 150$ A
c. 7.296+ j12.58 A
d. None of the above
ans:b

134. The square of a j operator _____
a. can never be negative
b. can never be positive
c. could be either positive or negative
d. is equal to j
ans:b

135. A complex number_____
a. is the same as imaginary number
b. has real and imaginary part
c. is negative number
d. is merely a technical term
ans:b

136. The sum of (3+j6) and (-3-j6) is ____
a.0+j0
b.6+j12
c. -6-j12
d. 0-j12
ans:a

137. The product of (-4-j7) and (6-j2) is_____
a. -24+j14
b. 24-j14
c. -38-j34
d. -24-j14
ans:c

138. A sinusoidal voltage is represented as: v = 141.4 sin(314.18t-π/2). Its rms value of voltage, frequency and phase angle are respectively____
a.141.42V, 314.16 Hz, 90 degrees
b. 100V, 50 Hz, -90 degrees
c. 87.92V, 56 Hz, 90 degrees
d. 200V, 50 Hz, -90 degrees
ans:b

139. When two sinusoidal waves are 90 degrees out of phase, then ____
a. both have their peak values at the same time
b. both have their minimum values at the same time
c. one has its peak value, other has zero value
d. none of these
ans:c

140. The direction of current in an AC circuit is _____
a. always in one direction
b. varying time to time periodically
c. unpredictable
d. from positive to negative
ans:b

141. Consider the sinusoidal waves: A sin (ωt+30) and B cos(ωt-60). The phase angle relationship between two waves is:
a. B wave lags A wave by 90 degrees
b. B wave lags A wave by 60 degrees
c. B wave lags A wave by 30 degrees
d. B wave and A wave are in phase
ans:d

142.When a phasor is multiplied by j and –j, it is rotated through _____ degrees in the anticlockwise direction respectively.
a.90, 270
b.90, 90
c.90, 180
d.270, 90
ans:a

143. If e_1 = 100 sin2πf and e_2 = 100 sin(2πf-Φ), then _____
a. e_1 lags e_2 by Φ
b. e_1 leads e_2 by Φ
c. e_2 lags e_1 by Φ
d. none of the above
ans:c

144.The phase difference between two waveforms can be compared when they _____
a. have the same frequency
b. have the same peak value
c. have the same effective value
d. are sinusoidal
ans:a

145. If two sinusoids of the same frequency but of different amplitude and phase difference are added, the resultant is a _____
a. sinusoid of same frequency
b. sinusoid of double the original frequency
c. sinusoid of half the original frequency
d. non-sinusoid
ans:a

146. If the phasor is multiplied by j, then ____
a. only its magnitude changes
b. only its direction changes
c. both magnitude and direction change
d. none of the above
ans:b

147. In the complex number 4+j7, 7 is called the _____ component
a. real
b. imaginary
c. in-phase
d. none of the above`
ans:d

148. The reciprocal of a complex number is a_____
a. complex number
b. real component only
c. quadrature component only
d. none of above
ans:a

149. If two complex numbers are equal, then_____
a. only their magnitudes will be equal
b. only their angles will be equal
c. their in phase and quadrature components will be separately equal
d.none of above
ans:c

150. A phasor 2∟180 can be expressed as____
a.j2
b.-j2
c.-2
d.2
ans:c

151. A current of (3+j4) A is flowing through a circuit. The magnitude of current is _____
a. 7 A
b. 5 A
c. 1 A
d. 1.33 A
ans:b

152. The voltage applied in a circuit is given by 100∟60 volts. It can be written as ____

a. 100∟-60
b.100∟240
c. 100∟-300
d. none of the above
ans:c

153. The conjugate of -4+j3 is _____
a. 4-j3
b. -4-j3
c.4+j3
d. none of the above
ans:b

154. The difference of two conjugate number results in _____
a. a complex number
b. in-phase component only
c. quadrature component only
d. none of the above
ans:c

155. The reciprocal of j is ____
a.j
b.-j
c.jxj
d.none of the above
ans:b

156. Two waves of same frequency have opposite phase when the phase angle between them is ___ degrees
a.360
b.180
c.90
d.0
ans: b

157. Two sinusoidal currents are given by i_1 = 100sin (ωt+π/3) and i_2 = 150sin(ωt-π/4). The phase difference between them is _____ degrees
a.15
b.50
c.60
d.105
ans:d

158. A phasor is _____
a. a line which represents the magnitude and phase of an alternating quantity
b. a line which represents the magnitude and direction of an alternating quantity
c. a colored tag or band for distinction between different phases of a 3 phase supply
d. an instrument used for measuring phases of an unbalanced 3 phase load
ans:b

159. A sinusoidal voltage v_1 leads another sinusoidal voltagev_2 by 180 degrees. Then ____
a. voltage v_2 leads voltage v_1 by 180 degrees
b. both voltage have their zero values at the same time
c. both voltage have their peak values at the same time
d. all of above
ans:d

160. If A = 10∟45 and B = 5∟15, then the value of A/B will be___
a.50∟60
b.2∟60
c. 2∟-30
d.2∟30
ans:d

161. The length of a phasor in a phasor diagram normally represents the …… value of the alternating quantity
a. rms or effective
b. average
c. peak
d. none of these
ans:a

162. The two quantities are said to be in phase with each other when
a. the phase difference between two quantities is zero degree or radian
b. each of them pass through zero values at the same instant and rise in the same direction
c. each of them pass through zero values at the same instant but rises in the opposite directions
d. either (a) or (b)
ans:d

163. The phase difference between the two waveforms can be compared only when they
a. have the same frequency
b. have the same peak value
c. have the same effective value
d. are sinusoidal
ans:a

164. The phasor diagram for alternating quantities can be drawn if they have …… waves
a. rectangular
b. sinusoidal
c. triangular
d. any of these
ans:b