12th Standard CBSE
Physics

Exam Time : 01:30:00 Hrs

Total Marks : 75

1) The peak value of 220 V a.c. is   1
(a) 220V (b) $\frac{220}{\sqrt{2}}V$ (c) 440V (d) $220\sqrt{2}V$

2) The resistance of a coil for direct current is 10ohm. When a.c. is sent through the same coil, its resistance would be   1
(a) 10ω (b) > 10ohm (c) < 10ohm (d) cannot say

3) The average value of a.c. voltage E=E_0 sin ωt over the time interval t = 0 to t=π/ω is   1
(a) $-2E_0/\pi$ (b) E_0/π (c) $\frac{2E_0}{\pi}$ (d) zero

4) The alternating current from a source is represented by I=0.5 sin 314t. The frequency of a.c. is   1
(a) 314 Hz (b) 100 Hz (c) 50 Hz (d) zero

5) Q factor of resonance is given by   1
(a) $\frac{1}{R}\sqrt{\frac{L}{C}}$ (b) $\frac{1}{R}\sqrt{\frac{C}{L}}$ (c) $\frac{1}{L}\sqrt{\frac{R}{C}}$ (d) $\frac{1}{C}\sqrt{\frac{L}{R}}$

6) The power factor of an a.c. circuit is given by cos ϕ=   1
(a) $\frac{R}{Z}$ (b) $\frac{Z}{R}$ (c) $\frac{R}{X_L}$ (d) $\frac{R}{X_C}$

7) The form factor of an a.c. generated is given by   1
(a) $\frac{I_{av}}{I_0}$ (b) $\frac{I_0}{I_{av}}$ (c) $\frac{I_{av}}{I_v}$ (d) $\frac{I_v}{I_{av}}$

8) The efficiency of d.c.motor id given by η=   1
(a) $\frac{back\ e.m.f.}{applied\ e.m.f.}$ (b) $\frac{applied\ e.m.f}{back\ e.m.f.}$ (c) $back\ e.m.f. \times applied\ e.m.f.$
(d) none of the above

9) A transformer is an electric device used for   1
(a) producing direct current (b) producing alternating current
(c) changing d.c. into a.c. (d) changing a.c. voltages

10) A battery of 12V is connected to primary of a transformer with turns ratio n_s/n_p= 10. Voltage across secondary would by   1
(a) 120 V (b) 1.3 V (c) 12 V (d) Zero

11) Out of the following, choose the wrong statement :   1
(a) A transformer cannot work on d.c.
(b) A transformer cannot change the frequency of a.c.
(c) A transformer can produce a.c. power
(d) In a transformer, when a.c. voltage is raised n times, the alternating current reduces to 1/n time.

12) A metal plate is getting heated. It can be because   1
(a) a direct current is passing through the plate
(b) it is placed in a time varying magnetic field
(c) it is placed in a space varying magnetic field, but does not vary with time
(d) a current is passing through the plate

13) To reduce the resonant frequency in an LCR series circuit with a generator   1
(a) the generator frequency should be reduced
(b) another capacitor should be added in parallel to the first
(c) the iron core of the inductor should be removed
(d) dielectric in the capacitor should be removed

14) Which of the following combinations should be selected for better tuning of an LCR circuit used for communication?   1
(a) R = 20Ω, L = 1.5H, C = 35μF (b) R = 25Ω, L = 2.5H, C = 45μF
(c) R = 15Ω, L = 3.5H, C = 30μF (d) R = 25Ω, L = 1.5H, C = 45μF

15) An induced of reactance 1 and a resistor of 2 are connected in series to the terminals of a 6V(rms) a.c. source. The power dissipated in the circuit is   1
(a) 8 W (b) 12 W (c) 14.4 W (d) 18 W

16) The output of a step-down transformer is measured to be 24V when connected to a 12 watt light blub. The value of the peak current is   1
(a) $1/\sqrt{2}A$ (b) $\sqrt{2}A$ (c) 2 A (d) $2\sqrt{2}A$

17) In an alternating current circuit consisting of elements in series, the current increases on increasing the frequency of supply. Which of the following elements are likely to constitute the circuit?   1
(a) Only resistor (b) Resistor and an inductor
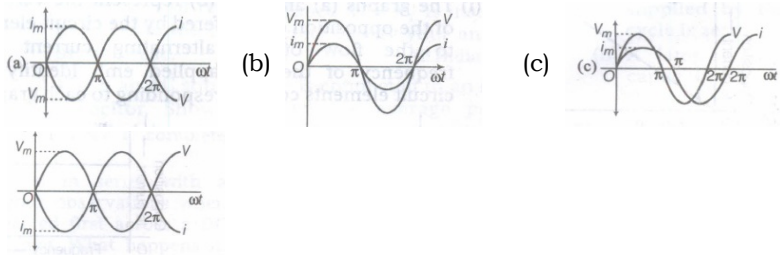(c) Resistor and a capacitor (d) Only a capacitor

18) Electrical energy is transmitted over large distances at high alternating voltages. Which of the following statements is (are) correct?
(a) For a given power level, there is a lower current
(b) Lower current implies less power loss
(c) Transmission lines can be made thinner
(d) It is easy to reduce the voltage at he receiveing end using step-down transformers

19) For an LCR circuit, the power transferred from the driving source to the driven oscillator from the driving source tothe driven oscillator is $P = I^2 Z \cos \phi$.
(a) Here, the power factor $\cos \phi \geq 0$, $P \geq 0$
(b) The driving force can given no energy to the oscillator (P = 0) in some cases
(c) The driving force can not syphon out (P< 0) the energy out of oscillator
(d) The driving force can take away energy out of the oscillator

20) When an AC voltage of 220V is applied to the capacitor C
(a) the maximum voltage between plates is 220V
(b) the current is in phase with he applied voltage
(c) The charge on the plates is in phase with the applied voltage
(d) power delivered to the capacitor is zero

21) Tthe line that draws power supply to your house from street has
(a) zero average current   (b) 220V average voltage
(c) voltage and current out of phase by 90°
(d) voltage and current possibly differing in phase ϕ such that $|\phi| < \frac{\pi}{2}$

22) A 50Hz AC current of crest value 1A flows through the primary of a transformer. If the mutual inductance between the primary and secondary be 0.5 H, the creast voltage induced in the secondary is
(a) 75 V   (b) 150 V   (c) 100 V   (d) none of these

23) The peak voltage in a 220 V, AC source is
(a) 220 V   (b) about 160 V   (c) about 310 V   (d) 440 V

24) If the rms current in a 50 Hz AC circuit is 5 A, the value of the current 1/300 s after its value becomes zero is
(a) $5\sqrt{2}A$ (b) $5\sqrt{3/2}$ A   (c) 5 / 6 A   (d) $5 / \sqrt{2}A$

25) If the reading of AC mains voltage by a voltmeter is 200 V, then the root mean square value of this voltage will be
(a) $200\sqrt{2}$ V   (b) $100\sqrt{2}$ V   (c) 200 V   (d) $400/\pi$ V

26) The reaping of an ammeter in an alternating circuit is 4 A.The peak (maximum) value of current in the circuit is
(a) 4 A   (b) 8 A   (c) $4\sqrt{2}$ A   (d) $\frac{2}{\sqrt{2}} A$

27) Which of the following graphs shows, in a pure resistor, the voltage and current are in phase?

28) Voltage and current in an ACcircuit are given by
v = 5 sin (100 πt - π/6) and I = 4 sin (l00 πt + π/6)
(a) voltage leads the current by 30°   (b) current leads the voltage by 30°
(c) current leads the voltage by 60°   (d) voltage leads the current by 60°

29) A resistance of 20 Ω is connected to a source of an alternating potential, V = 220 sin (100πt). The time taken by current to change from its peak value to rms value is
(a) 0.2 s   (b) 0.25 s   (c) 25 x 10⁻³ s   (d) 2.5 x 10⁻³ s

30) The inductive reactance is directly proportional to the
(a) inductance   (b) frequency of the current   (c) Both (a) and (b)
(d) amplitude of current

31) A pure inductor of 25.0 mH is connected to a source of 220 V. Find the inductive reactance if the frequency of the source is 50 Hz.
(a) 785 Ω   (b) 6.50 Ω   (c) 7.85 Ω   (d) 8.75 Ω

32) Current I across the capacitor in a purely capacitive AC circuit is
(a) $i_m \sin (\omega t + \pi/4)$ (b) $i_m \sin (\omega t + \pi/2)$ (c) $i_m \cos (\omega t + \pi/4)$
(d) $i_m \cos (\omega t + \pi/2)$

33) The amplitude of the oscillating current in the a pure capacitive AC circuit is, if V = Vmsinrotand capacitance = C.
(a) $\omega C V_m$ (b) $2\omega C V_m$ (c) $\frac{\omega C V_m}{4}$ (d) $\frac{3\omega C V_m}{2}$

34) A 15.0 μF capacitor is connected to a 220 V,50 Hz source. The capacitive reactance is
(a) 220 Ω   (b) 215 Ω   (c) 212 Ω   (d) 204 Ω

35) L, C, and R, represents self inductance, capacitance and resistance respectively. Which of the following dimensional formula is not of frequency?
(a) $\frac{1}{RC}$ (b) $\frac{R}{L}$ (c) $\frac{1}{\sqrt{LC}}$ (d) $\frac{C}{L}$

36) In a series L-C-R circuit, the capacitance C is changed to 4C. To keep the resonant frequency same, the inductance must be changed by
(a) 2L (b) L/2 (c) 4L (d) L/4

37) A power transmission line feeds input power at 2300 V to a step-down transformer with its primary windings having 4000 turns. What should be the number of turns in the secondary in order to get output power at 230 V?
(a) 600 (b) 550 (c) 400 (d) 375

38) What is not possible in a transformer?
(a) Eddy current (b) Direct current (c) Alternating current
(d) Induced current

39) The large scale transmission and distribution of electrical energy over long distances is done with the use of
(a) dynamo (b) transformers (c) generator (d) capacitor

40) A 60 W load is connected to the secondary of a transformer whose primary draws line voltage of 220 V. If a current of 0.54 A flows in the load, then what is the current in the primary coil?
(a) 2.7 A (b) 0.27 A (c) 1.65 A (d) 2.85 A

41) If an AC main supply is given to be 220 V. What would be the average emf during a positive half-cycle?
(a) 198 V (b) 386 V (c) 256 V (d) None of these

42) If an alternating voltage is represented as E = 141 sin (628 t), then the rms value of the voltage and the frequency are respectively
(a) 141 V, 628 Hz (b) 100 V, 50 Hz (c) 100 V, 100 Hz
(d) 141 V, 100 Hz

43) In a purely inductive AC circuit, L = 30.0 mH and the rms voltage is 150 V, frequency v = 50 Hz. The inductive reactance is
(a) 15.9 Ω (b) 9.42 Ω (c) 10 Ω (d) 8.85 Ω

44) In an AC circuit, the power factor
(a) is zero when the circuit contains an ideal resistance only
(b) is unity when the circuit contains an ideal resistance only
(c) is unity when the circuit contains a capacitance only
(d) is unity when the circuit contains an ideal inductance only

45) If in an alternating circuit, the voltage is V and current is I, then the value of power dissipated in the circuit is
(a) VI (b) VI/2 (c) VI/$\sqrt{2}$ (d) depends upon the angle between V and I

46) In an AC circuit, the instantaneous values of emf and current are e = 200 sin (314) t V and I = sin (314t + π/3) A. The average power consumed is
(a) 200 W (b) 100 W (c) 50 W (d) 25 W

47) A coil of resistance 50 Ω and inductance 10 H is connected with a battery of 50 V. The energy stored in the coil is
(a) 125 J (b) 62.5 J (c) 250 J (d) 500 J

48) The value of power factor is maximum in an alternating circuit, when circuit consists
(a) only inductive (b) only capacitive (c) only L- C (d) only resistive

49) In R-L-C series circuit with C = 1.00 nF two values of R are
(i) R = 100 Ω and
(ii) R = 200 Ω For the source applied with V_m = 100 V. Resonant frequency is
(a) 1 x 10^3 rad/s (b) 1 x 10^6 rad/s (c) 1.56 x 10^6 rad/s
(d) 1.75 x 10^3 rad/s

50) The L-C-R circuit is connected to source of an alternating current. At the resonance, the phase difference between current flowing in the circuit and potential difference will be
(a) zero (b) π/4 (c) π/2 (d) π

51) The phenomenon of resonance is common among systems that have a tendency
(a) to oscillate at a' particular frequency (b) to get maximum amplitude
(c) Both (a) and (b) (d) Neither (a) nor (b)

52) The value of emf in the secondary coil of transformer depends on
(a) the number of turns (b) material used (c) voltage (d) induced flux

53) As the frequency of an ac circuit increases, the current first increases and then decreases. What combination of circuit elements is most likely to comprise the circuit?
(a) Inductor and capacitor. (b) Resistor and inductor
(c) Resistor and capacitor. (d) Inductor only.

54) The phase difference between the alternating current and emf is π/2. Which of the following cannot be the constituent of the circuit?
(a) C alone (b) L alone (c) L and C (d) R and L

55) In an LCR-series ac circuit, the voltage across each of the component L, C and R is 50 V. The voltage across the LC-combination will be
(a) 50 V (b) $50\sqrt{2}$ V (c) 100 V (d) zero

56) An ac circuit has a resistance of 12 ohm and an impedance of 15 ohm. The power factor of the circuit will be
(a) 0.8 (b) 0.4 (c) 0.125 (d) 1.25

57) In an ac circuit the voltage applied is $\varepsilon = \varepsilon_0 \sin$ wt. The resulting current in the circuit is $I = I_0 \sin(\omega t - \pi/2)$. The power consumption in the circuit is given by
(a) $P = \sqrt{2}\varepsilon_0 I_0$ (b) $P = \frac{\varepsilon_0 I_0}{\sqrt{2}}$ (c) $P = 0$ (d) $P = \frac{\varepsilon_0 I_0}{2}$

58) In an LCR circuit, capacitance is charged from C to 2C. For resonant frequency to remain unchanged, the inductance should be changed from L to
(a) 4L (b) 2L (c) L/2 (d) L/4

59) The core of any transformer is laminated so as to
(a) reduce the energy loss due to eddy currents (b) make it light weight.
(c) make it robust and strong (d) increase the secondary voltage.

60) In an a.c. generator, a coil with N turns, all of the same area A and total resistance R, rotates with frequency ω in a magnetic field B the maximum value of emf generated in the coil is
(a) NABR (b) NABω (c) NABRω (d) NAB

61) If coil is open, then L and R becomes
(a) infinity, zero (b) zero, infinity (c) infinity, infinity (d) zero, zero

62) In a series, LCR-circuit, resonant frequency depends on
(a) $\frac{L}{C}$ (b) $\sqrt{LC}$ (c) $\frac{1}{\sqrt{LC}}$ (d) $\sqrt{\frac{L}{C}}$

63) Which quantity is increased in a step-down transformer?
(a) Current (b) Voltage (c) Power (d) Frequency

64) The peak value of ac voltage on a 220 V mains is
(a) $200\sqrt{2}$ V (b) $230\sqrt{2}$ V (c) $220\sqrt{2}$ V (d) $240\sqrt{2}$ V

65) Series ac circuit has inductance L, resistance R and angular frequency co, the quality factor Q is
(a) $\left(\frac{\omega L}{R}\right)^2$ (b) $\frac{\omega l}{R}$ (c) $\frac{R}{\omega L}$ (d) $\left(\frac{R}{\omega L}\right)^2$

66) A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0.5A, the efficiency of the transformer is approximately
(a) 30% (b) 50% (c) 90% (d) 10%

67) Choose the correct statement.
(a) A capacitor can conduct a dc circuit but not an inductor
(b) In a de circuit the inductor can conduct but not a capacitor
(c) In dc circuit both the inductor and capacitor cannot conduct
(d) The inductor has infinite resistance in a dc circuit

68) What is the value of inductance L for which the current is maximum in a series LCR-circuit with C = 10 μF and $\omega = 1000$ S^{-1}?
(a) 100 mH (b) 1 mH (c) 10 mH
(d) cannot be calculated unless R is known

69) A coil of self-inductance L is connected in series with a bulb B and an ac source. Brightness of the bulb decreases when
(a) frequency of the ac source is decreased.
(b) number of turns in the coil is reduced
(c) a capacitance of reactance $X_C = X_L$ in included
(d) an iron rod is inserted in the coil

70) The reactance of a capacitor C is X. If both the frequency and capacitance be doubled, then new reactance will be
(a) X (b) 2X (c) 4X (d) $\frac{X}{4}$

71) A transformer works on the principle of
(a) converter. (b) inverter. (c) mutual inductance (d) self-inductance

72) Alternating current cannot be measured by de ammeter, because
(a) ac cannot pass through ac ammeter (b) ac charges direction
(c) average value of current of complete cycle is zero
(d) ac ammeter will get damaged

73) Average power generated in an inductor connected to an a.c. source is
(a) $1/2$ LI^2 (b) LI^2 (c) zero (d) none of these

74) The power factor varies between
(a) 2 and 2.5 (b) 3.5 to 5 (c) 0 to 1 (d) 1 to 2

75) Reciprocal of impedance is
(a) susceptance (b) conductance (c) admittance (d) transconductance

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