Alternating current

1. What will be the phase difference between virtual voltage and virtual current, when the current in the circuit is wattless

- 90_0
- 180_0
- 45_0
- 60_0

---

2. The potential difference V across the current i flowing through an instrument in an ac circuit of frequehcy f are given by $v = 5 \cos \omega t$ volts and $i = 2 \sin \omega t$ amperes (where $\omega = 2 \pi f$). The power dissipated in. the instrument is. [CPMT 1977, 80;]

- Zero watt
- 5 watt
- 10 watt
- 2.5 watt

---

3. The inductive reactance of an inductor of $1/\pi$ henry at 50 Hz frequency is

- $50/\pi$ ohm
- 100 ohm
- $\pi/50$ ohm
- 50 ohm

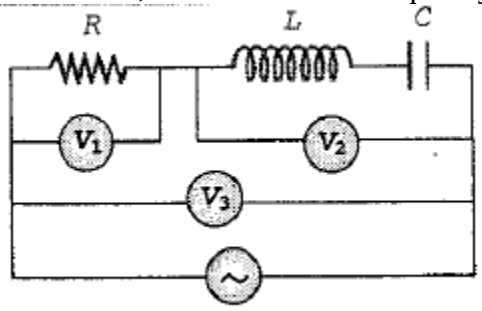
---

4. A LC circuit is in the state of resonance. If $c = 0.1$ μF and $L = 0.25$ henry. Neglecting ohmic resistance of circuit what is the frequency of oscillations

- 1007 Hz
- 109 Hz
- 100 Hz
- 500 Hz

---

5. A resistor R, an inductor L, a capacitor C and voltmeters V_1, V_2 and V_3 are connected to an oscillator in the circuit as shown in the adjoining diagram. When the frequency of the oscillator is increased, then at resonant frequency the reading of voltmeter V_3 is equal to .



- That of voltmeter V_1
- Both of the voltmeters V_1 and V_2
- That of voltmeter V_2
- None of these

6. When V = 100 sin ωt is applied across a series (RLC) circuit at resonance the current in resistance (R = 100Ω) is i= io sin ωt, then power dissipation in circuit is

- 50 W
- 25 W
- 100 W
- Can't be calculated

---

7. If instantaneous current is given by i= 4 cos(ωt+ø) amperes, then the r.m.s. value of current is

- 4 amperes
- $4\sqrt{2}$ amperes
- $2\sqrt{2}$ amperes
- Zero amperes

---

8. If a current i given by i0 sin (ωt-π/2) flows in an ac circuit across which an ac potential of E = E 0 sin ωt has been applied, then the power consumption P in the circuit will be

- $p = E_0 i_0 / \sqrt{2}$
- $p = E_0 i_0 / 2$
- $p = \sqrt{2} E_0 i_0$
- $p = 0$

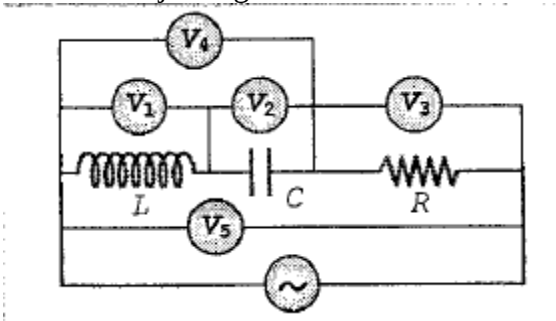
---

9. An electric lamp is connected to 220 V, 50 Hz supply. Then the peak value of voltage is

- 210 V
- 311 V
- 211 V
- 320 V

---

10. In the adjoining ac circuit the voltmeter whose reading will be zero at resonance is .



- V_1
- V_3
- V_2
- V_4

11. An ac supply gives 30 V r.m.s. which passes through a 10 Ω resistance. The power dissipated in it is

- 90 √2 w
- 45 √2 w
- 90 w
- 45 w

Atomic and Nuclear

1. The half life of a radioactive element which has only 1/32 of its original mass left after a lapse of 60 days is. [MP PET 1992; DP]

- 12 days
- 60 days
- 32 days
- 64 days

---

2. A radioactive substance has a half life of 60 minutes. After 3 hours, the fraction of atom that have decayed would be. [BHU 1995; 2000]

- 12.5%
- 8.5%
- 87.5%
- 25.1%

---

3. An electron in the n = 1 orbit of hydrogen atom is bound by 13.6 eV. If a hydrogen atom is in the n = 3 state, how much energy is required to ionize it. [MP PMT 1995]

- 13.6 eV
- 3.4 eV
- 4.53 eV
- 1.51 eV

---

4. The radius of the first (lowest) orbit of the hydrogen atom is a_0 The radius of the second (next higher) orbit will be. [MP PET 2002; MP]

- $4a_0$
- $8a_0$
- $6a_0$
- $10a_0$

---

5. The energy required to remove an electron in a hydrogen atom from state is. [MP PMT 1993]

- 13.6 eV
- 0.136 eV
- 1.36 eV
- 0.0136 eV

6. The ratio of the kinetic energy to the total energy of an electron in a Bohr orbit is. [Roorkee 1995; B]

- - 1
- 1 : 2
- 2
- None of these

---

7. The average life T and the decay constant of a radioactive nucleus are related as. [CPMT 1983]

- $T\lambda = 1$
- $T/\lambda = 1$
- $T = 0.693 / \lambda$
- $T = c / \lambda$

---

8. In the above figure D and E respectively represent. [CPMT 1986, 88]

- Absorption line of Balmer series and the ionization potential of hydrogen
- Spectral line of Balmer series and the maximum wavelength of Lyman series
- Absorption line of Balmer series and the wavelength lesser than lowest of the Lyman series
- Spectral line of Lyman series and the absorption of greater wavelength of limiting value of Paschen series

---

9. Bohr's atom model assumes. [KCET 2005]

- The nucleus is of infinite mass and is at rest
- Mass of electron remains constant
- Electrons in a quantized orbit will not radiate energy
- All the above conditions

---

10. Hydrogen atom excites energy level from fundamental state to n = 3. Number of spectrum lines according to Bohr, is. [CPMT 1997]

- 4
- 1
- 3
- 2

11. The count rate of a Geiger- Muller counter for the radiation of a radioactive material of half life of 30 minutes decreases to 5 per sec after 2 hours. The initial count rate was. [CBSE PMT 1995]

- 25 per sec
- 625 per sec
- 80 per sec
- 20 per sec

---

12. The spectral series of the hydrogen spectrum that lies in the ultravio region is the. [CPMT 1990; MP P]

- Balmer series
- Paschen series
- Pfund series
- Lyman series

---

13. Which of the following statements about the Bohr model of the hydrogen atom is false. [MP PMT 1995]

- Acceleration of electron in n = 2 orbit is less than that in n = 1 orbit
- Kinetic energy of electron in n = 2 orbit is less than that in n = 1 orbit
- Angular momentum of electron in n = 2 orbit is more than that in n = 1 orbit
- Potential energy of electron in n = 2 orbit is less than that in n = 1 orbit

---

14. The wavelength of yellow line of sodium is 5896 Å. Its wave number will be. [MP PET 2001]

- 50883×10^{10} per second
- 17581 per cm
- 16961 per cm
- 50883 per cm

---

15. Number of spectral lines in hydrogen atom is. [CPMT 1997]

- 3
- 15
- 6
- Infinite

16. In the following atoms and moleculates for the transition from n= 2 to n = 1, the spectral line of minimum wavelength will be produced by. [IIT 1983]

- Hydrogen atom
- Uni-ionized helium
- Deuterium atom
- di-ionized lithium

---

17. Minimum energy required to takeout the only one electron from ground state of He+ is. [CPMT 2002]

- 13.6 eV
- 27.2 eV
- 54.4 eV
- 6.8 eV

---

18. In the spectrum of hydrogen atom, the ratio of the longest wavelength in Lyman series to the longest wavelength in the Balmer series is. [UPSEAT 2004]

- 5/27
- 4/9
- 1/93
- 3/2

---

19. In any Bohr orbit of the hydrogen atom, the ratio of kinetic energy to potential energy of the electron is. [MP PET 1994]

- 1/2
- -1/2
- 2
- - 2

---

20. If the ionisation potential of helium atom is 24.6 volt, the energy required to ionise it will be. [MP PMT 1996]

- 24.6 eV
- 13.6 V
- 24.6 V
- 13.6 eV

21. Which of the following is true for number of spectral lines in going form Layman series to Pfund series. [RPET 2001]

- Increases
- Unchanged
- Decreases
- May decreases or increases

---

22. Which of the following is in the increasing order for penetrating power. [IIT 1994; RPET]

- α, β, γ
- γ, α, β
- β, α, γ
- γ, β, α

---

23. If in nature there may not be an element for which the principal quantum number n > 4, then the total possible number of elements will be. [IIT 1983; MP PE]

- 60
- 4
- 32
- 64

---

24. When hydrogen atom is in its first excited level, its radius is .... its ground state radius. [CBSE PMT 1997]

- Half
- Twice
- Same
- Four times

---

25. The mass number of a nucleus is. [IIT 1986; MP PM]

- Always less than its atomic number
- Always equal to its atomic number
- Always more than its atomic number
- Sometimes more than and sometimes equal to its atomic number

26. The angular momentum of electron in nth orbit is given by. [Roorkee 1993]

- nh
- nh/2π
- h/2πn
- $n^2h/2\pi$

---

27. The frequency of 1st line of Balmer series in H_2 atom is v_0 The frequency of line emitted by singly ionised He atom is. [CPMT 2002]

- $2v_0$
- $v_0 / 2$
- $4v_0$
- $v_0 / 4$

---

28. The kinetic energy of electron in the first Bohr orbit of the hydrogen atom is. [Pb. PET 2000]

- - 6.5 eV
- 13.6 eV
- - 27.2 eV
- - 13.6 eV

---

29. When a hydrogen atom is raised from the ground state to an excited state. [CBSE PMT 1995;]

- P.E. increases and K.E. decreases
- Both kinetic energy and potential energy increase
- P.E. decreases and K.E. increases
- Both K.E. and P.E. decrease

---

30. If an electron jumps from 1st orbital to 3rd orbital, then it will.. [AFMC 1996]

- Absorb energy
- No gain of energy
- Release energy
- None of these

31. In the Bohr's hydrogen atom model, the radius of the stationary orbit is directly proportional to (n = principle quantum number). [CBSE PMT 1996;]

- n^{-1}
- n^{-2}
- n
- n^2

---

32. A radioactive element emits 200 particles per second. After three hours 25 particles per second are emitted. The half life period of element will be

- 50 minutes
- 70 minutes
- 60 minutes
- 80 minutes

---

33. Which of the following is true. [MP PET 1993]

- Lyman series is a continuous spectrum
- Balmer series is a line spectrum in the ultravio
- Paschen series is a line spectrum in the infrared
- The spectral series formula can be derived from the Rutherford model of the hydrogen atom

---

34. The Lyman series of hydrogen spectrum lies in the region. [UPSEAT 2002]

- Infrared
- Ultravio
- Visible
- Of X rays

---

35. In hydrogen atom, when electron jumps from second to first orbit, then energy emitted is. [AIEEE 2002]

- - 13.6 eV
- - 6.8 eV
- - 27.2 eV
- None of these

36. Half life of radioactive element depends upon. [NCERT 1978; AFM]

- Amount of element present
- Pressure
- Temperature
- Nature of element

---

37. Radioactivity is

- Irreversible process
- Spontaneous process
- Self disintegration process
- All of the above

---

38. The particles which can be added to the nucleus of an atom without changing its chemical properties are called. [NCERT 1979]

- Electrons
- Neutrons
- Protons
- None of the above

---

39. Minimum excitation potential of Bohr's first orbit in hydrogen atom is. [BHU 1998;]

- 13.6 V
- 10.2 V
- 3.4 V
- 3.6 V

---

40. If the radioactive decay constant of radium is 1.07 * 10-7 per year, then its half life period is approximately equal to. [AIIMS 1998]

- 8,900 years
- 6,476 years
- 7,000 years
- 2,520 years

41. The decay constant of a radioactive element is 0.01 per second. Its half life period is. [DPMT 2001]

- 693 sec
- 0.693 sec
- 6.93 sec
- 69.3 sec

Communication

1. For television broadcasting, the frequency employed is normally . [AMU 2002]

- 30-300 MHz
- 30-300 KHz
- 30-300 GHz
- 30-300 Hz

---

2. The process of superimposing signal frequency (i.e. audio wave) on the carrier wave is known as . [AIIMS 1987]

- Transmission
- Modulation
- Reception
- Detection

---

3. What is the modulation index of an over modulated wave

- 1
- < 1
- Zero
- > 1

---

4. In short wave communication waves of which of the following frequencies will be reflected back by the ionospheric layer, having electron density 10^{11} per m^3 . [AIIMS 2003]

- 2 MHz
- 12 MHz
- 10 MHz
- 18 MHz

---

5. An antenna is a device

- That converts electromagnetic energy into radio frequency signal
- That converts guided electromagnetic waves into free space electromagnetic waves and vice-versa
- That converts radio frequency
- None of these

signal into electromagnetic energy

6. In an FM system a 7 kHz signal modulates 108 MHz carrier so that frequency deviation is 50 kHz. The carrier swing is

- 7.143
- 0.71
- 8
- 350

---

7. For sky wave propagation of a 10 MHz signal, what should be the minimum electron density in ionosphere . [AIIMS 2005]

- ~ $1.2 * 10^{12}$ per m^3
- ~ 10^{14} per m^3
- ~ 10^{6} per m^3
- ~ 10^{22} per m^3

---

8. Indicate which one of the following system is digital

- Pulse position modulation
- Pulse width modulation
- Pulse code modulation
- Pulse amplitude modulation

---

9. Which of the following is the disadvantage of FM over AM

- Larger band width requirement
- Higher modulation power
- Larger noise
- Low efficiency

---

10. The waves used in telecommunication are

- IR
- Microwave
- UV
- Cosmic rays

11. Range of frequencies allotted for commercial FM radio broadcast is . [MNR 1997]

- 88 to 108 MHz
- 8 to 88 MHz

- 88 to 108 kHz
- 88 to 108 GHz

---

12. Basically, the product modulator is

- An amplifier
- A frequency separator
- A mixer
- A phase separator

---

13. In which of the following remote sensing technique is not used . [Kerala PMT 2005]

- Forest density
- Wetland mapping
- Pollution
- Medical treatment

---

14. The maximum distance upto which TV transmission from a TV tower of height h can be received is proportional to . [AIIMS 2003]

- $h^{1/2}$
- $h^{3/2}$
- h
- h^2

---

15. Audio signal cannot be transmitted because . [Kerala PMT 2005]

- The signal has more noise
- The transmitting antenna length is very small to design
- The signal cannot be amplified for distance communication
- The transmitting antenna length is very large and impracticable

16. Through which mode of propagation, the radio waves can be sent from one place to another . [JIPMER 2003]

- Ground wave propagation
- Space wave propagation
- Sky wave propagation
- All of them

17. A laser beam is used for carrying out surgery because it . [AIIMS 2003]

- Is highly monochromatic
- Is highly directional
- Is highly coherent
- Can be sharply focussed

18. Television signals on earth cannot be received at distances greater than 100 km from the transmission station. The reason behind this is that . [DCE 1995]

- The receiver antenna is unable to detect the signal at a distance greater than 100 km
- The TV signals are less powerful than radio signals
- The TV programme consists of both audio and video signals
- The surface of earth is curved like a sphere

19. Consider telecommunication through optical fibres. Which of the following statements is not true . [AIEEE 2003]

- Optical fibres may have homogeneous core with a suitable cladding
- Optical fibres are subject to electromagnetic interference from outside
- Optical fibres can be of graded refractive index
- Optical fibres have extremely low transmission loss

20. A step index fibre has a relative refractive index of 0.88%. What is the critical angle at the corecladding interface . [Manipal 2003]

- 60°
- 45°
- 75°
- None of these

21. In frequency modulation . [Kerala PMT 2005]

- The amplitude of modulated wave varies as frequency of carrier wave
- The amplitude of modulated wave varies as amplitude of carrier wave
- The frequency of modulated wave varies as amplitude of modulating wave
- The frequency of modulated wave varies as frequency of modulating wave

---

22. In an amplitude modulated wave for audio frequency of 500 cycle/second, the appropriate carrier frequency will be . [AMU 1996]

- 50 cycles/sec
- 500 cycles/sec
- 100 cycles/sec
- 50,000 cycles/sec

---

23. Laser beams are used to measure long distances because . [DCE 2002, 03]

- They are monochromatic
- They are coherent
- They are highly polarised
- They have high degree of parallelism

---

24. The phenomenon by which light travels in an optical fibres is . [DCE 2001]

- Reflection
- Total internal reflection
- Refraction
- Transmission

---

25. Advantage of optical fibre . [DCE 2005]

- High bandwidth and EM interference
- High band width, low transmission capacity and no EM interference
- Low bandwidth and EM interference
- High bandwidth, high data transmission capacity and no EM interference

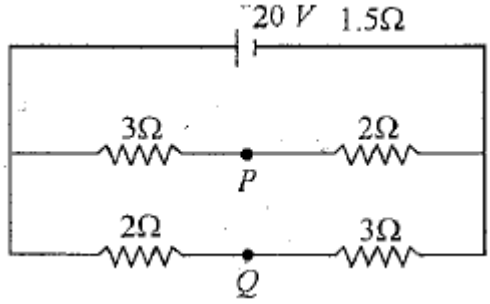
Current Electricity

1. A uniform resistance wire of length L and diameter d has a resistance R. Another wire of same material has length 4L and diameter 2d, the resistance will be

- 2R
- R/2
- R
- R/4

---

2. If in the circuit shown, the internal resistance of the battery is 1.5 Ω and V_P and V_Q are the potentials at P & Q respectively what is the potential difference between P and Q .



- Zero
- 4 volts ($V_Q > V_P$)
- 4 volts ($V_P > V_Q$)
- 2.5 volts ($V_Q > V_P$)

---

3. In a metre bridge experiment null point is obtained at 20 em. from one end of the wire when resistance X is balanced against another resistance Y. If X < Y, then where will be the new position of the null point from the same end, if one decides to balance a resistance of 4 X against Y

- 40 cm
- 50 cm
- 80 cm
- 70 cm

---

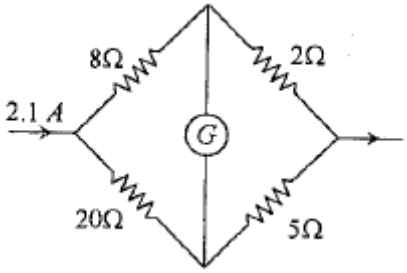
4. The resistance of a wire is R. If the length of the wire is doubled by stretching, then the new resistance will be

- 2R
- R
- 4R
- R/4

5. Three resistors are connected to form the sides of a triangle ABC, the resistance of the sides AB, BC and CA are 40 ohms; 60 ohms and 100 ohms respectively. The effective resistance between the points A and B in ohms will be. [JIPMER 2002]

- 32
- 50
- 64
- 200

6. In the given figure, when galvanometer shows no deflection, the current (in ampere) flowing through 5Ω resistance will be.



- 0.5
- 0.9
- 0.6
- 1.5

7. The internal resistance of a cell is the resistance of

- Electrodes of the cell
- Electrolyte used in the cell
- Vessel of the cell
- Material used in the cell

8. If a wire of resistance R is melted and recasted to half of its length, then the new resistance of the wire will be. [KCET (Med.) 200]

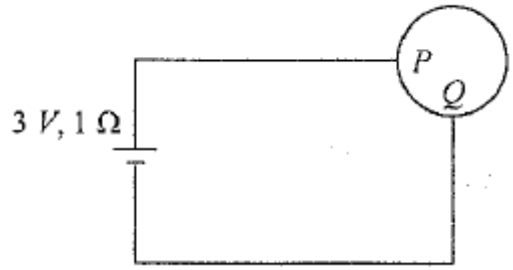
- R/4
- R
- R/2
- 2R

9. Two wires of the same material are given. The first wire is twice as long as the second and has twice the diameter of the second. The resistance of the first will be

- Twice of the second
- Equal to the second
- Half of the second
- Four times of the second

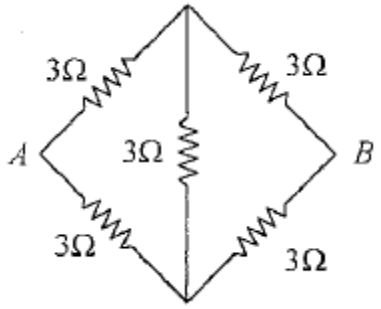
---

10. A wire of resistance 10 Ω is bent to form a circle,Pand Q are points on the circumference of the circle dividing it into a quadrant and are connected to a battery of 3 V and internal resistance 1 Ω as shown in the figure. The currents in the two parts of the circle are .



- 6/23 A and 18/23 A
- 4/25 A and 12/25 A
- 5/26 A and 15/26 A
- 3/25 A and 9/25 A

11. The equivalent resistance of the following diagram between A and B is .



- 2/4 Ω
- 6 Ω
- 9 Ω
- none of these

---

12. An unknown resistance R1 is connected in series with a resistance of 10Ω. This combination is connected to one gap of a metre bridge while a resistance R2 is connected in the other gap. The balance point is at 50 em. Now, when the 10 Ω resistance is removed the balance position shifts to 40 em. The value of R1 is (in ohm)

- 10
- 40
- 20
- 60

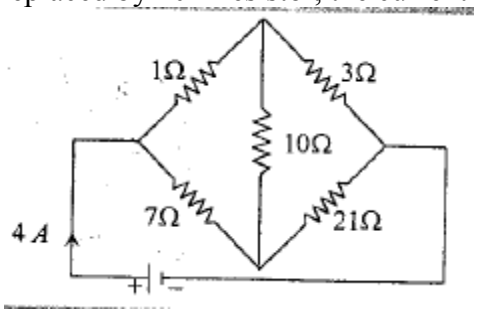
---

13. Three resistances R, 2Rand 3R are connected in parallel to a battery. Then

- The current through each resistance is same
- the heat developed in resistance 3R is maximum
- The potential drop across resistance 2R is maximum
- the heat developed in resistance R is maximum

---

14. In the circuit shown in figure, the current drawn from the battery is 4 A. If 10 Ω resistor is replaced by 20Ω resistor, the current further drawn from the circuit will be .



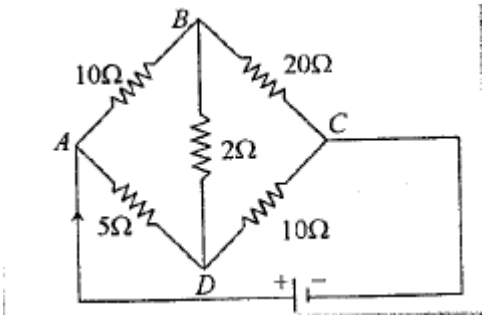
- 1 A
- 3 A
- 2A
- 0 A

---

15. A 6 volt battery is connected to the terminals of a three metre long wire of uniform thickness and resistance of 100 ohm. The difference of potential between two points on the wire separated by a distance of 50 em will be

- 1 Volt
- 2 Volt
- 1.5 Volt
- 3 Volt

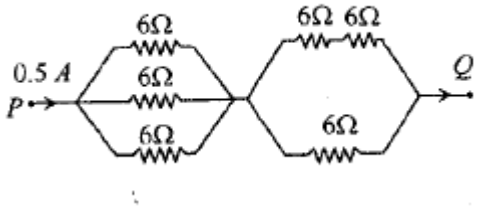
16. There is no current in 2 Ω resistance, then the equivalent resistance of the given circuit is .



- 10 Ω
- 13/7Ω
- 30/10 Ω
- 7/13 Ω

---

17. Resistances of 6 ohm each are connected in the manner shown in adjoining figure. With the current ampere as shown in figure, the potential difference VP - VQ is .

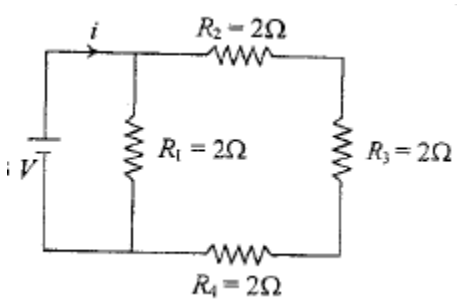


- 3.6 V
- 3.0 v
- 6.0 v
- 7.2 v

---

18. Read the following statements carefully Y: The resistivity of a semiconductor decreases with increase of temperature Z : In a conducting solid, rate of collisions between free electrons and ions increases with increases of temperature Select the correct statements (s) from the following

- Y is true but Z is false
- Both Y and Z are true
- Y is false but Z is true
- Y is true and Z is the correct reason for Y



19. What is the current (i) in the circuit as shown in figure .

- 2 A
- 1 A
- 1.2 A
- 0.5 A

---

20. By increasing the temperature, the specific resistance of a conductor and semiconductor

- Increases for both
- Increases, decreases
- Decreases for both
- Decreases for both

21. When cells are arranged in parallel

- The current capacity decreases
- The emf increases
- The current capacity increases
- The emf decreases

---

22. When a piece of aluminium wire finite length is drawn through a series of dies to reduce its diameter to half its original value, its resistance will become

- 2 times
- 8 times
- 4 times
- 16 times

---

23. If an ammeter is to be used in place of a voltmeter the we must connect with the ammeter a

- Low resistance in parallel
- High resistance in series
- High resistance in parallel
- Low resistance in series

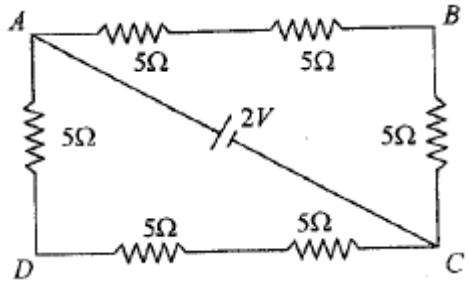
---

24. The lead wires should have

- Larger diameter and low resistance
- Smaller diameter and low resistance
- Smaller diameter and high resistance
- Larger diameter and high resistance

---

25. The potential difference between points A and B of adjoining figure is .



- 2/3 V
- 4/3 V
- 8/9 V
- 2 V

26. The resistors of resistances 2 Ω, 4 Ω and 8 Ω are connected in parallel, then the equivalent resistance of the combination will be

- 8/7 Ω
- 7/4 Ω
- 7/8 Ω
- 4/9 Ω

---

27. The resistance of a coil is 4.2 Ω at 100°C and the temperature coefficient of resistance of its material is 0.004 °C. Its resistance at Q °C is

- 6.5 C
- 3Ω
- 5Ω
- 4Ω

---

28. What is unit for specific resistance ?. [Rugved]

- ohm/cm
- ohm.cm.cm
- ohm.cm
- ohm

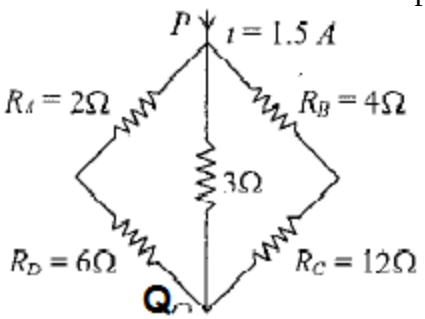
29. There are three voltmeters of the same range but of resistances 10000 Ω, 8000 Ω and 4000 Ω respectively. The best voltmeter among these is the one whose resistance is

- 10000 Ω
- 40000 Ω
- 80000 Ω
- None of these

30. If six identical cells each having an emf of 6 V are connected in parallel, the emf of the combination is

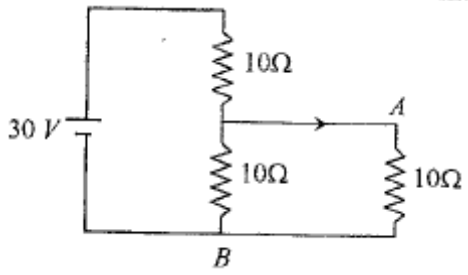
- 1V
- 1/6 V
- 36V
- 6V

31. Potential difference between the points P and Q in the electric circuit shown is.



- 4.5 V
- 2.4 V
- 1.1 V
- 2.88 V

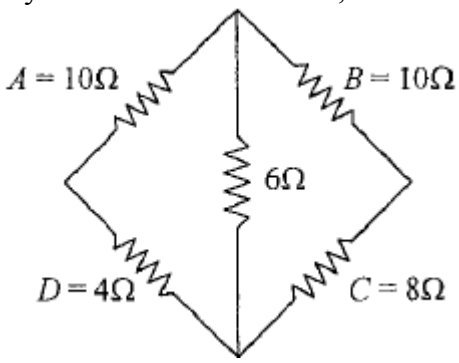
32. In the following figure potential difference between A and B is .



- 0 volt
- 10 volt
- 5 volt
- 15 volt

---

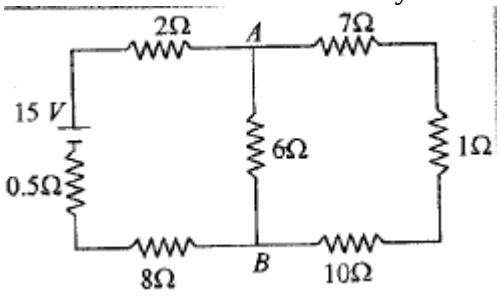
33. In a typical Wheatstone network the resistances in cyclic order are A = 10 Ω, B = 10 Ω, C = 4 nand D = 4 Ω. For the bridge to be balanced.



- 10 Ω should be connected in parallel with A
- 5 Ω should be connected in series with B
- 10 Ω should be connected in series with A
- 5 Ω should be connected in parallel with B

---

34. The current from the battery in circuit diagram shown is .



- 1 A
- 1.5 A
- 2 A
- 3 A

35. The resistance of 20 em long wire is 5 ohm. The wir~ is stretched to a uniform wire of 40 em length. The resistance now will be (in ohms)

- 5
- 20
- 10
- 200

36. Six identical cells of emf E and internal resistance r are connected in parallel, then the net emf and internal resistance of the combination will be

- 6E: 6r
- E,6r
- E,r/6
- E/6,r/6

37. Which of the following does not obey Ohm's law

- Copper
- Diode-valve
- Aluminium
- None of these

38. Two wires A and B of same material and same mass have radius 2 r and r. If resistance of wire A is 34 Ω, then resistance of B will be

- 544 Ω
- 68 Ω
- 272 Ω
- 17 Ω

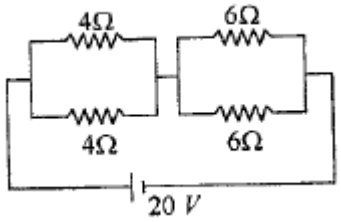
39. A uniform wire of resistance R is uniformly compressed along its length, until its radius becomes n times the original radius. New resistance of the wire becomes

- R/n^4
- R/n
- R/n^2
- nR

40. At what temperature will the resistance of a copper wire become three times its value at 0°C? (Temperature coefficient of resistance for copper = 4 x 10-3 per 0C)

- 400 ^{0} c
- 500 ^{0} c
- 450 ^{0} c
- 550 ^{0} c

41. Four resistances are connected in a circuit in the given figure. The electric current flowing through 4 ohm a 6 ohm resistance is respectively .



- 2 amp and 4 amp
- 1 amp and 1 amp
- 1 amp and 2 amp
- 2 amp and 2 amp

42. A metal wire of specific resistance 64 x 10-6 Ωcm and length 198 em has resistance of 7 Ω. The radius of the wire will be

- 2.4 cm
- 0.024 cm
- 0.24 cm
- 24 cm

43. Two resistance wires on joining in parallel, the resultant resistance is 6/5 Ω. One of the wire breaks. The effective resistance is 2 Ω. The resistance of the brokes wire was

- 3/5 Ω
- 6/5 Ω
- 2 Ω
- 3 Ω

44. The internal resistance of a cell of emf 12 V is 5 x 10 -2 Ω . It is connected across an unknown resistance. Voltage across the cell, when a current of 60 A is drawn from it, is

- 15 V
- 9 V
- 12 V
- 6 V

---

45. A wire of 50 cm long and 1 mm² in cross-sectional area carries a current 4A when connected to a 2V battery. The resistivity of the wire is

- 2×10^{-7} Ωm
- 4×10^{-6} Ωm
- 5×10^{-7} Ωm
- 1×10^{-6} Ωm

46. A uniform wire of resistance 9 n is cut into 3 equal parts. They are connected in the form of equilateral triangle ABC. A cell of emf 2V anj negligible internal resistance is connected across B and C. Potential difference across AB is

- 1 V
- 3V
- 2V
- 0.5V

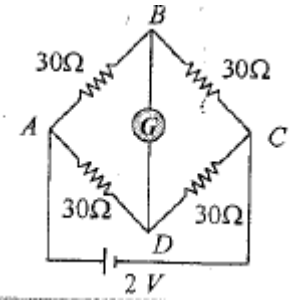
---

47. The number of dry cells, each of emf 1.5 volt and internal resistance 0.5 ohm that must be joined in series with a resistance of 20 ohm so as to send a current of 0.6 ampere through the circuit is

- 2
- 10
- 8
- 12

---

48. In the following figure current flowing through BD. is .



- 0
- 0.066 A
- 0.033 A
- None of these

---

49. A cell of internal resistance 3 ohm and emf 1 volt is connected to a uniform wire of length 500 em and resistance 3 ohm. The potential gradient in the wire is

- 30 mV/cm
- 20 mV/cm
- 1 mV/cm
- 4 mV/cm

---

50. Two resistance r1 and r2 (r1 < r2) are connected in parallel. Their equivalent resistance R is

- $R < r_1$
- $r_1 < R < (r_1 + r_2)$
- $r_1 < R < r_2$
- $R < (r_1 > r_2)$

Elasticity

1. A wire extends by 1 mm when a force is applied. Double the force is applied to another wire of same material and length but half the radius of cross-section. The elongation of the wire in mm will be. [EAMCET 1986]

- 8
- 2
- 4
- 1

---

2. If the density of the material increases, the value of Young's modulus

- Increases
- First increases then decreases
- Decreases
- First decreases then increases

---

3. The material which practically does not show elastic after effect is. [JIPMER 1997; AM]

- Copper
- Steel
- Rubber
- Quartz

---

4. A force F is needed to break a copper wire having radius R. The force needed to break a copper wire of radius 2R will be . [MP PET 1990]

- F/2
- 4F
- 2F
- F/4

---

5. The quality of the material which opposes the change in shape, volume or length is called

- Intermolecular repulsion
- Viscosity
- Intermolecular behaviour
- Elasticity

6. A steel wire is stretched with a definite load. If the Young's modulus of the wire is Y. For decreasing the value of Y

- Radius is to be decreased
- Length is to be increased
- Radius is to be increased
- None of the above

---

7. The ratio of lengths of two rods A and B of same material is 1 : 2 and the ratio of their radii is 2 : 1, then the ratio of modulus of rigidity of A and B will be

- 4 : 1
- 8 : 1
- 16 : 1
- 1 : 1

---

8. The ratio of the lengths of two wires A and B of same material is 1 : 2 and the ratio of their diameter is 2 : 1. They are stretched by the same force, then the ratio of increase in length will be. [MP PET/PMT 1988]

- 2 : 1
- 1 : 8
- 1 : 4
- 8 : 1

---

9. If the temperature increases, the modulus of elasticity

- Decreases
- Remains constant
- Increases
- Becomes zero

---

10. When a certain weight is suspended from a long uniform wire, its length increases by one cm. If the same weight is suspended from another wire of the same material and length but having a diameter half of the first one then the increase in length will be . [CPMT 1984, 90]

- 0.5 cm
- 4 cm
- 2 cm
- 8 cm

11. The force constant of a wire does not depend on

- Nature of the material
- Length of the wire
- Radius of the wire
- None of the above

---

12. Which statement is true for a metal. [DPMT 2001]

- $Y < \eta$
- $Y > \eta$
- $Y = \eta$
- $Y < 1/\eta$

---

13. If the length of a wire is reduced to half, then it can hold the ..... load

- Half
- Double
- Same
- One fourth

---

14. The dimensions of four wires of the same material are given below. In which wire the increase in length will be maximum when the same tension is applied . [IIT 1981;CPMT 1]

- Length 100 cm, Diameter 1 mm
- Length 300 cm, Diameter 3 mm
- Length 200 cm, Diameter 2 mm
- Length 50 cm, Diameter 0.5 mm

---

15. The bulk modulus of an ideal gas at constant temperature . [MP PMT 2004]

- Is equal to its volume V
- Is equal to its pressure p
- Is equal to p/2
- Can not be determined

16. Two wires of copper having the length in the ratio 4 : 1 and their radii ratio as 1 : 4 are stretched by the same force. The ratio of longitudinal strain in the two will be

- 1 : 16
- 1 : 64
- 16 : 1
- 64 : 1

---

17. The possible value of Poisson's ratio is . [EAMCET (Med.) 1]

- 1
- 0.8
- 0.9
- 0.4

18. The elasticity of invar

- Increases with temperature rise
- Does not depend on temperature
- Decreases with temperature rise
- None of the above

19. If Young's modulus of iron is 2*1011 N/m2 and the interatomic spacing between two molecules is 3*10-10 metre, the interatomic force constant is . [JIPMER 1978]

- 60 N/m
- 30 N/m
- 120 N/m
- 180 N/m

20. When a spiral spring is stretched by suspending a load on it, the strain produced is called

- Shearing
- Volume
- Longitudinal
- Transverse

21. In a wire of length L, the increase in its length is l. If the length is reduced to half, the increase in its length will be

- l
- l/2
- 2l
- None of the above

22. In the three states of matter, the elastic coefficient can be

- Young's modulus
- Modulus of rigidity
- Coefficient of volume elasticity
- Poisson's ratio

23. The spring balance does not read properly after its long use, because

- The elasticity of spring increases
- Its plastic power decreases
- The elasticity decreases
- Its plastic power increases

---

24. Which one of the following quantities does not have the unit of force per unit area. [MP PMT 1992]

- Stress
- Young's modulus of elasticity
- Strain
- Pressure

---

25. The ratio of the adiabatic to isothermal elasticities of a triatomic gas is. [MP PET 1991]

- 3/4
- 1
- 4/3
- 5/3

26. When compared with solids and liquids, the gases have

- Minimum volume elasticity
- Maximum Young's modulus
- Maximum volume elasticity
- Maximum modulus of rigidity

---

27. Modulus of rigidity of diamond is

- Too less
- Less than all matters
- Greater than all matters
- Zero

---

28. Hook's law defines . [MP PMT/PET 1988]

- Stress
- Modulus of elasticity
- Strain
- Elastic limit

29. A copper wire and a steel wire of the same diameter and length are connected end to end and a force is applied, which stretches their combined length by 1 cm. The two wires will have. [MP PMT 1992]

- Different stresses and strains
- The same strain but different stresses
- The same stress and strain
- The same stress but different strains

30. The isothermal elasticity of a gas is equal to . [CPMT 1981; MP P]

- Density
- Pressure
- Volume
- Specific heat

31. Two wires of equal lengths are made of the same material. Wire A has a diameter that is twice as that of wire B. If identical weights are suspended from the ends of these wires, the increase in length is . [MP PMT 1990; MP]

- Four times for wire A as for wire B
- Half for wire A as for wire B
- Twice for wire A as for wire B
- One-fourth for wire A as for wire B

32. After effects of elasticity are maximum for

- Glass
- Rubber
- Quartz
- Metal

33. The increase in length is l of a wire of length L by the longitudinal stress. Then the stress is proportional to . [MP PET 1986]

- L/l
- l*L
- l/L
- l^2*L

34. Two identical wires of rubber and iron are stretched by the same weight, then the number of atoms in the iron wire will be . [DPMT 1999]

- Equal to that of rubber
- More than that of the rubber
- Less than that of the rubber
- None of the above

35. The area of cross-section of a wire of length 1.1 metre is 1 mm2. It is loaded with 1 kg. If Young's modulus of copper is 1.1 * 1011 N/m2 , then the increase in length will be (If g = 10). [MP PET 1989]

- 0.01 mm
- 0.1 mm
- 0.075 mm
- 0. 15 mm

36. Density of rubber is d. A thick rubber cord of length L and cross-section area A undergoes elongation under its own weight on suspending it. This elongation is proportional to

- dL
- Ad/L^2
- Ad/L
- dL^2

37. Increase in length of a wire is 1 mm when suspended by a weight. If the same weight is suspended on a wire of double its length and double its radius, the increase in length will be . [CPMT 1976]

- 2 mm
- 4 mm .
- 0.5 mm
- 0.25 mm

38. The Young's modulus of a wire of length L and radius r is Y N/m2. If the length and radius are reduced to L/2 and r/2, then its Young's modulus will be . [MP PET 1997; KC]

- Y/2
- 2Y
- Y
- 4Y

39. The longitudinal strain is only possible in

- Gases
- Solids
- Fluids
- Liquids

40. A rod of length l and area of cross-section A is heated from 0°C to 100°C. The rod is so placed that it is not allowed to increase in length, then the force developed is proportional to . [NCERT 1976]

- l
- A
- l^{-1}
- A^{-1}

41. Modulus of rigidity of a liquid. [RPET 2000]

- Non zero constant
- Zero
- Infinite
- Can not be predicted

42. The compressibility of a material is

- Product of volume and its pressure
- The fractional change in volume per unit change in pressure
- The change in pressure per unit change in volume strain
- None of the above

43. If Young's modulus for a material is zero, then the state of material should be

- Solid
- Gas
- Solid but powder
- None of the above

44. The extension of a wire by the application of load is 3 mm. The extension in a wire of the

same material and length but half the radius by the same load is . [CMEET Bihar 199]

- 12 mm
- 15 mm
- 0.75 mm
- 6 mm

---

45. A and B are two wires. The radius of A is twice that of B. They are stretched by the some load. Then the stress on B is . [MP PMT 1993]

- Equal to that on A
- Two times that on A
- Four times that on A
- Half that on A

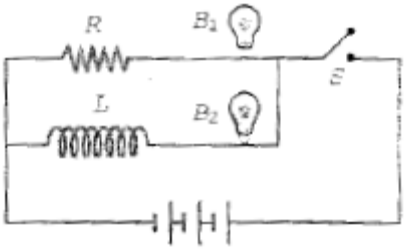
Electro Magnetic Induction

1. A motor having an armature of resistance 2Ω is designed to operate at 220 V mains. At full speed, it develops a back e.m.f. of 210 V. When the motor is running at full speed, the current in the armature is

- 5 A
- 110 A
- 105 A
- 215 A

---

2. Figure shows two bulbs 81 and 82, resistor Rand an inductor L When the switch Sis turned off.



- Both B_1 and B_2 die out promptly
- B_1 dies out promptly but B_2 with some delay
- Both B_1 and B_2 die out with some delay
- B_2 dies out promptly but B_1 with some delay

---

3. The coefficient of mutual inductance between two coils A and B depends upon

- Medium between coils
- Both A and B
- Separation between coils
- None of these

---

4. In a step-up transformer the turn ratio is 1: 10. A resistance of 200 ohm connected across the secondary is drawing a current of 0.5 amp. What is the primary voltage and current

- 50 V, 1 amp
- 25 V, 4 amp
- 10 V, 5 amp
- 20 V, 2 amp

---

5. An e.m.f. of 12 volt is produced in a coil when the current in it changes at the rate of 45 amp/minute. The inductance of the coil is

- 0.25 henry
- 9.6 henry
- 1.5 henry
- 16.0 henry

6. The coil of a dynamo is rotating in a magnetic field.~ihe developed induced e.m.f. changes and the number of magnetic lines of force also changes. Which of the following conditions is correct

- Lines of force minimum but induced e.m.f. is zero
- Lines of force maximum but induced e.m.f. is not zero
- Lines of force maximum but induced e.m.f. is zero
- Lines of force maximum but induced e.m.f. is also maximum

---

7. Fan is based on

- Electric motor
- Both
- Electric dynamo
- None of these

---

8. The armature current in a de motor is maximum when the motor has

- Picked up maximum speed
- Intermediate speed
- Just started
- None of these

---

9. Initially plane of coil is parallel to the uniform magnetic field 8. In time M it becomes perpendicular to magnetic field, then charge flows in it depend on this time as

- $\propto \Delta t$
- $\propto (\Delta t)^{\circ}$
- $\propto 1/\Delta t$
- $\propto (\Delta t)^2$

---

10. The mutual inductance between a primary and secondary circuits is 0.5 H. The resistances of the primary and the secondary circuits are 20 ohms and 5 ohms respectively. To generate a current of 0.4 A in the secondary, current in the primary must be changed at the rate of

- 4.0 A/s
- 1.6 A/s
- 16 A/s
- 8.0 A/s

11. In a transformer, the coefficient of mutual inductance between the primary and the secondary coil is 0.2 henry. When the current changes by 5 ampere/second in the primary, the induced e.m.f. in the secondary will be. [MP PMT 1989]

- 5 V
- 25 V
- 1 V
- 10 V

---

12. large transformer when used for some time. become hot and are cooled by circuiatmg oil. The heating of transformer is due to

- Heating effect of current alone
- Both the hysteresis loss and heating effect of current
- Hysteresis loss along
- None of the above

---

13. A step down tra11-:.rormer a supply line voltage of 2200 volt into 220 volt. The primary coil has 5000 turns. The efficienc•· and power transmitted by the transformer are 90% and 8 kilowatt respectively. Then the number of rurns in the secondary is. [IIT-JEE 1996; R]

- 5000
- 500
- 50
- 5

---

14. The current passing through a choke coil of 5 henry is decreasing at the rate of 2 amperejsec. The e.m.f. developing across the coil is

- 10 V
- 2.5 V
- -10 V
- -2.5 V

---

15. The current through an inductor of 1 H is given by I= 3 t sin t. The voltage across the inductor of 1 H is

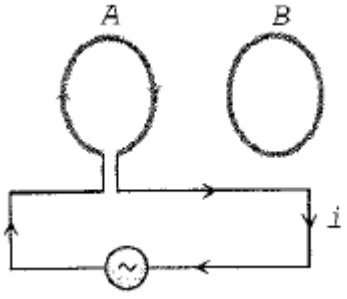
- 3 sin t + 3 cos t
- 3 sin t + 3t cost
- cost + tsin t
- 3t cos t - 3 sin t

16. The primary winding of a transformer has 500 turns and its secondary has 5000 turns. If primary is connected to ac supply of 20 V and 50 Hz thensecondary will have an output of

- 2 Vand 5Hz
- 200 V and 50 Hz
- 2 Vand 50Hz
- 200 Vand 500Hz

---

17. Two circular coils A and Bare facing each other as shown in figure. The current i through A



can be altered .

- There will be repulsion between A and
- There will be neither attraction nor repulsion

B if i is increased

when i is changed

There will be a'ttractiori between A and B if i is increased

Attraction or repulsion between A and B depends on the direction of

---

18. A varying current at the rate of 3 A/s in coil generates an e.m.f. of 8 mV in a near by coil. The mutual inductance of the two coils is

- 2.66 mH
- 2.66 H
- 2.66 mH x 10^{-3}
- 0.266 H

---

19. The current flowing in a coil of self inductance 0.4 mH is increased by 250 mA in 0.1 sec. The e.m.f. induced will be

- + 1 volt
- +1 mV
- - 1 volt
- - 1mV

---

20. A step up transformer operates on a 230 volt line and supplies to a load of 2 amp. The ratio of turns in primary to secondary windir.gs is 1 : 25. Determine the primary current. [AIIMS 1989; CBS]

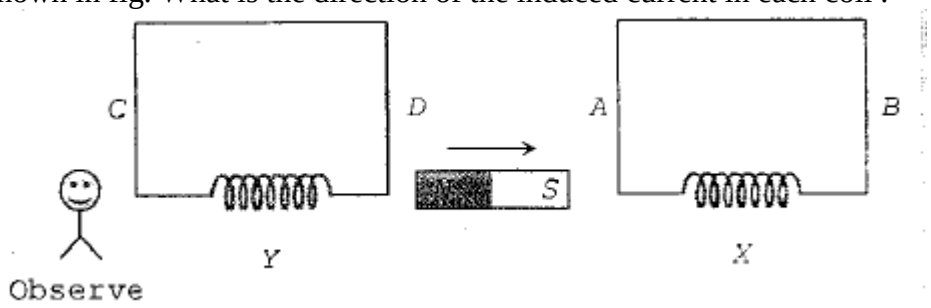
- 12.5 amp
- 8.8 amp
- 50 amp
- 25 amp

21. A coil is wound on a frame of rectangular cross-section. If all the linear dimensions of the frame are increased by a factor of 2 and the number of turns per unit length of the coil remains the same, the selfinductance increased by a factor of

- 4
- 16
- 8
- 32

---

22. A magnet is moved in the direction indicated by an arrow between two coils AB and CD as shown in fig. What is the direction of the induced current in each coil .



- A to Bin coil X and C to D in coil Y
- B to A in coil X and C to D in coil Y
- A to Bin coil X and D to C in coil Y
- B to A in coil X and D to C in coil Y

---

23. A coil of area 100 cm2 has 500 turns. Magnetic field of 0.1 weberjmetre² is perpendicular to the coil. The field is reduced to zero in 0.1 second. The induced emf in the coil is

- 1 V
- 50 V
- 5 V
- Zero

---

24. In a coil of area 20 cm² and 10 turns with magnetic field directed perpendicular to the plane changing at the rate of 10^4 T/s. The resistance of the coil is 20 Ω. The current in the coil will be

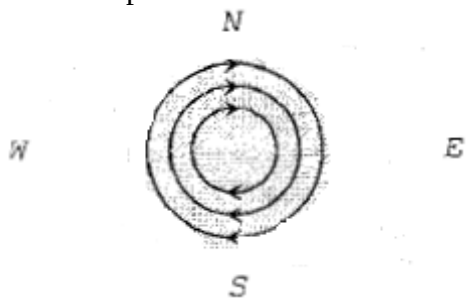
- 10A
- 0.5A
- 20A
- 1.0A

---

25. When the speed of a de motor increase the armature current

- Increases
- Does not change
- Decreases
- Increases and decreases continuously

26. When a sheet of metal is placed in a magnetic field, which changes from zero to a maximum value, induced currents are set up in the direction as shown in the diagram. What is the direction

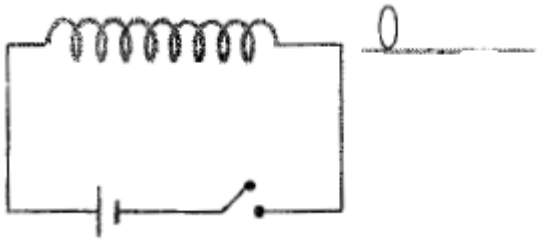


of the magnetic field.

- Into the plane of paper
- Out of the plane of paper
- Into the plane of paper
- North to south

---

27. Figure shows a horizontal solenoid connected to a battery and a switch. A copper ring is placed on a frictionless track, the axis of the ring being along the axis of the solenoid. As the



switch is closed, the ring will .

- Remain stationary
- Move away from the solenoid
- Move towards the solenoid
- Move towards the solenoid or away from it depending on which terminal (positive or negative) of the battery is connected to the left end of the solenoid

---

28. A wire coil carries the current i. The potential energy of the coil does not depend upon

- The value of i
- Whether the coil has an iron core or not
- The number of turns in the coil
- The resistance of the coil

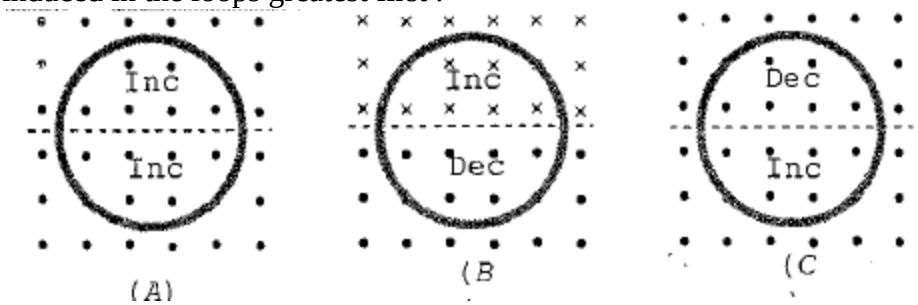
---

29. The number of turns in the primary coil of a tra.nsformer is 200 and the number of turns in the secondary coil is 10. If 240 volt ac is applied to the primary,.the.outputfrom the secondary will be

- 48 V
- 12 V
- 24 V
- 6 V

---

30. The figure shows three situation in whiol,f'Jdentical circular conducting loops are in uniform magnetic field that are either increasing or decreasing in magnitude at identical rates. in each,the dashed line coincides with a diameter Rank the situations according to magnitudeo the current induced in the loops greatest first .



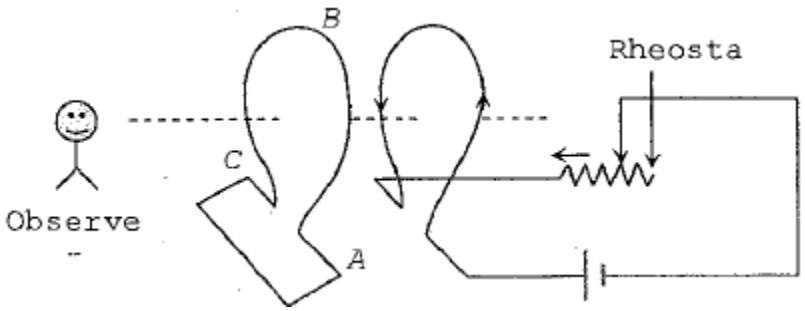
- $i_a = i_b < i_c$ (i_c != 0)
- $i_a >= i_b > i_c$ (i_c != 0)
- $i_a = i_b > i_c$ ($i_c = 0$)
- $i_a < i_b < i_c$ (i_c != 0)

31. Find out the e.m.f. produced when the current changes from 0 to 1A in 10 second given, L = 10 ,μH

- 1 V
- 1 mV
- 1 μH
- 1 V

---

32. Figure shows two coils placed close to each other. When the current through one coil is increased gradually 61 by shifting the position of the rheostat .



- A current flows along ABC in the other coil
- No current flows in the other coil
- A current flows along CBA in the other coil
- An alternating current flows in the other coil

---

33. Two coils A and B having turns 300 and 600 respectively are placed nea.r each other, on passing a current of 3.0 ampere in A, the flux linked with A is 1.2 x 10-4 weber and with B it is 9.0 x 10-5 weber. The mutual inductance of the system is

- 2×10^{-5} henry
- 4×10^{-5} henry
- 3×10^{-5} henry
- 6×10^{-5} henry

---

34. If a coil of metal wire is kept stationary in a non-uniform magnetic field, then. [BHU 2000]

- An emf is induced in the coil
- Neither emf nor current is induced
- A current is induced in the coil
- Both emf and current is induced

---

35. A transformer is used to

- Change the alternating potential
- Both alternating current and alternating voltage
- Change the alternating current
- To increase the power of current source

36. A coil having an area of 2 m^2 placed in a magnetic field which changes from 1 to 4 weber/m^2 in 2 seconds. The e.m.f. induced in the coil will be

- 4 volt
- 2 volt
- 3 volt
- 1 volt

---

37. An electric motor operates on a 50 volt supply and a current of 12 A. If the efficiency of the motor is 30%, what is the resistance of the winding of the motor

- 6 Ω
- 2.9 Ω
- 4 Ω
- 3.1 Ω

---

38. The equivalent inductance of two inductances is 2.4 henry when connected in parallel and 10 henry when connected in series. The difference between the two inductances is

- 2 henry
- 4 henry
- 3 henry
- 5 henry

---

39. A thin circular ring of area A is held perpendicular to a uniform magnetic field of induction 8. A small cut is made in the ring and a galvanometer is connected across the ends such that the total resistance of the circuit is R. When the ring is suddenly squeezed to zero area, the charge flowing through the galvanometer is

- BR / A
- ABR
- AB / R
- B^2A / R^2

---

40. The number of turns of primary and secondary coils of a transformer are 5 and 10 respectively and the mutual inductance of the transformer is 25 henry. Now the number of turns in the primary and secondary of the transformer are made 10 and 5 respectively. The mutual inductance of the transformer in henry will be

- 6.25
- 25
- 12.5
- 50

41. Work of electric motor is

- To convert ac into de
- Both (a) and (b)
- To convert de into ac
- To convert ac into mechanical work

42. The inductance of a closed-packed coil of 400 turns is 8 mH. A current of 5 mA is passed through it. The magnetic flux through each tum of the coil is

- $1/4\pi\ \mu_0$Wb
- $1/3\pi\ \mu_0$Wb
- $1/2\pi\ \mu_0$Wb
- $0.4\ \mu_0$Wb

43. S.I. unit of magnetic flux is

- Weber m^{-2}
- Weber / m
- Weber
- Weber / m^4

44. Two identical circular loops of metal wire are lying on a table without touching each other. Loop A carries a current which increases with time. In response the loop B

- Remain stationery
- Is repelled by the loop A
- Is attracted by the loop A
- Rotates about its CM with CM fixed

45. The number of turns in the coil of an ac generator is 5000 and the area of the coil is 0.25 m2; the coil is rotated at the rate of 100 cycle per second in a magnetic field of 0.2 weberjm2. The pack value of the e.m.f. generated is nearly. [PMT (AMU) 1995]

- 786 kV
- 220 kV
- 440 kV
- 157.1 kV

46. A solenoid of length i metre has self im:iuctance L henary if number of turns are doubled, its self inductance

- Remains same
- Becomes 4L henry
- Becomes 2L henry
- Becomes L/√2 henry

47. A square loop PQRS is carried away from a current carrying long straight conducting wire CD (figure). The direction of induced current in the loop will be.

- Anticlockwise
- Some times clockwise sometimes anticlockwise
- Clockwise
- Current will not be induced

48. A coil of copper having 1000 turns is placed in a magnetic field (B = 4 x 10-5) perpendicular to its plane. The cross-sectional area of the coil is 0.05 m^2 If it turns through 180° in 0.01 second, then the EMF induced in the coil is. [AIIMS 1997]

- 0.4V
- 0.04V
- 0.2V
- 4V

49. If the current is halved in a coil then the energy stored is how much times the previous value

- 1/2
- 2
- 1/4
- 4

50. As shown in the figure, P and Q are two coaxial conducting loops separated by some distance. When the switch S is closed, a clockwise current lP flows in P (as seen by observer) and an induced current iQ_1 flows in Q. The switch remain closed for a long time. When S is opened, a current iQ_2 flows in Q. Then the directions of iQ_1 and iQ_2 (as seen by observer) are

- Respectively clockwise and anticlockwise
- Both anticlockwise
- Both clockwise
- Respectively anticlockwise and clockwise

Electronics

1. In extrinsic P and N-type, semiconductor materials, the ratio of the impurity atoms to the pure semiconductor atoms is about . [MP PET 2003]

- 1
- 10^{-4}
- 10^{-1}
- 10^{-7}

---

2. A piece of copper and the other of germanium are cooled from the room temperature to 80 K, then which of the following would be a correct statement . [IIT-JEE 1988;MP]

- Resistance of each increases
- Resistance of copper increases while that of germanium decreases
- Resistance of each decreases
- Resistance of copper decreases while that of germanium increases

---

3. The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon P-N junctions are . [AIIMS 2000]

- Drift in forward bias, diffusion in reverse bias
- Diffusion in both forward and reverse bias
- Diffusion in forward bias, drift in reverse bias
- Drift in both forward and reverse bias

---

4. The energy band gap is maximum in . [AIEEE 2002]

- Metals
- Insulators
- Superconductors
- Semiconductors

---

5. Which of the following materials is non crystalline . [CBSE PMT 1993]

- Copper
- Wood
- Sodium chloride
- Diamond

6. PN-junction diode works as a insulator, if connected . [CPMT 1987]

- To A.C.
- In reverse bias
- In forward bias
- None of these

---

7. In P-type semiconductor, there is . [MP PMT 1989]

- An excess of one electron
- A missing atom
- Absence of one electron
- A donar level

---

8. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the. [AIEEE 2003]

- Variation of scattering mechanism with temperature
- Variation of the number of charge carriers with temperature
- Crystal structure
- Type of bon

---

9. Biaxial crystal among the following is . [Pb. CET 1998]

- Calcite
- Selenite
- Quartz
- Tourmaline

---

10. Which of the following is an amorphous solid . [AIIMS 2005;]

- Glass
- Salt
- Diamond
- Sugar

11. When the P end of P-N junction is connected to the negative terminal of the battery and the N end to the positive terminal of the battery, then the P-N junction behaves like. [MP PET 2002]

- A conductor
- A super-conductor
- An insulator
- A semi-conductor

---

12. For a crystal system, a = b = c, $\alpha = \beta = \lambda \; != 90^0$, the system is . [BHU 2000]

- Tetragonal system
- Orthorhombic system
- Cubic system
- Rhombohedral system

---

13. The output of OR gate is 1. [CBSE PMT 2004]

- If both inputs are zero
- Only if both input are 1
- If either or both inputs are 1
- If either input is zero

---

14. The coordination number of Cu is . [AMU 1992]

- 1
- 8
- 6
- 12

---

15. In the middle of the depion layer of a reverse-biased PN junction, the. [AIEEE 2003]

- Potential is zero
- Potential is maximum
- Electric field is zero
- Electric field is maximum

16. The ionic bond is absent in . [J & K CET 2005]

- NaCl
- LiF
- CsCl
- H_2O

---

17. Which of the following logic gate is an universal gate . [AIIMS 2005]

- OR
- AND
- NOT
- NOR

---

18. The emitter-base junction of a transistor is …… biased while the collector-base junction is ……. biased . [KCET 2004]

- Reverse, forward
- Forward, forward
- Reverse, reverse
- Forward, reverse

---

19. On increasing the reverse bias to a large value in a PN-junction diode, current . [MP PMT 1994; BH]

- Increases slowly
- Suddenly increases
- Remains fixed
- Decreases slowly

---

20. In a PN-junction diode . [MP PET 1993]

- The current in the reverse biased condition is generally very small
- The reverse biased current is strongly dependent on the applied bias voltage
- The current in the reverse biased condition is small but the forward biased current is independent of the bias voltage
- The forward biased current is very small in comparison to reverse biased current

---

21. A semiconductor dopped with a donor impurity is . [AFMC 2005]

- P-type
- NPN type
- N-type
- PNP type

---

22. Zener breakdown in a semi-conductor diode occurs when . [UPSEAT 2002]

- Forward current exceeds certain value
- Forward bias exceeds certain value
- Reverse bias exceeds certain value
- Potential barrier is reduced to zero

---

23. N-type semiconductors will be obtained, when germanium is doped with. [AIIMS 2000]

- Phosphorus
- Arsenic
- Aluminium
- Both (a) or (c)

---

24. Bonding in a germanium crystal (semi- conductor) is . [CPMT 1986; MP P]

- Metallic
- Vander Waal's type
- Ionic
- Covalent

---

25. The nature of binding for a crystal with alternate and evenly spaced positive and negative ions is . [CBSE PMT 2000]

- Covalent
- Dipolar
- Metallic
- Ionic

26. Boolean algebra is essentially based on . [AIIMS 1999]

- Truth
- Symbol
- Logic
- Numbers

27. A piece of semiconductor is connected in series in an electric circuit. On increasing the temperature, the current in the circuit will. [RPMT 2003]

- Decrease
- Increase
- Remain unchanged
- Stop flowing

28. When Ge crystals are doped with phosphorus atom, then it becomes . [AFMC 1995;]

- Insulator
- N-type
- P-type
- Superconductor

29. Energy bands in solids are a consequence of . [DCE 1999, 2000;]

- Ohm's Law
- Bohr's theory
- Pauli's exclusion principle
- Heisenberg's uncertainty principle

30. Holes are charge carriers in . [IIT-JEE 1996]

- Intrinsic semiconductors
- P-type semiconductors
- Ionic solids
- Metals

31. A transistor is used in common emitter mode as an amplifier. Then . [IIT-JEE 1998]

- The base-emitter junction is forward biased
- The input signal is connected in series with the voltage applied to the base-emitter junction
- The base-emitter junction is reverse biased
- The input signal is connected in series with the voltage applied to bias the base collector junction

32. Electronic configuration of germanium is 2, 8, 18 and 4. To make it extrinsic semiconductor small quantity of antimony is added . [MP PET 1999]

- The material obtained will be N-type germanium in which electrons and holes are equal in number
- The material obtained will be N-type germanium which has more electrons than holes at room temperature
- The material obtained will be P-type germanium
- The material obtained will be N-type germanium which has less electrons than holes at room temperature

---

33. In a semiconductor . [AIEEE 2002; AII]

- There are no free electrons at any temperature
- There are no free electrons at 0 K
- The number of free electrons is more than that in a conductor
- None of these

---

34. The valence of an impurity added to germanium crystal in order to convert it into a P-type semi conductor is . [MP PMT 1989; CP]

- 6
- 4
- 5
- 3

---

35. In a PN-junction diode not connected to any circuit . [IIT-JEE 1998]

- The potential is the same everywhere
- There is an electric field at the junction directed from the N- type side to the P- type side
- The P-type is a higher potential than the N-type side
- There is an electric field at the junction directed from the P-type side to the N-type side

36. A PN- junction has a thickness of the order of . [BIT 1990]

- 1 cm
- 10^{-6} m
- 1 mm
- 10^{-12} cm

37. To a germanium sample, traces of gallium are added as an impurity. The resultant sample would behave like . [AIIMS 2003]

- A conductor
- An N-type semiconductor
- A P-type semiconductor
- An insulator

38. In a PN-junction . [CBSE PMT 2002]

- P and N both are at same potential
- High potential at P side and low potential at N side
- High potential at N side and low potential at P side
- Low potential at N side and zero potential at P side

39. When NPN transistor is used as an amplifier . [AIEEE 2004]

- Electrons move from base to collector
- Electrons move from collector to base
- Holes move from emitter to base
- Holes move from base to emitter

40. In N-type semiconductors, majority charge carriers are . [AIIMS 1999]

- Holes
- Neutrons
- Protons
- Electrons

41. Which of the following statements concerning the depion zone of an unbiased PN junction is (are) true . [IIT-JEE 1995]

- The width of the zone is independent of the densities of the dopants (impurities)
- The electric field in the zone is produced by the ionized dopant atoms
- The width of the zone is dependent on the densities of the dopants
- The electric field in the zone is provided by the electrons in the conduction band and the holes in the valence band

Electrostatics

1. Electric potential at equatorial point of a small dipole with dipole moment p (At r, distance from the dipole) is. [MP PMT 2001]

- Zero
- $p/4\pi\varepsilon_0 r^3$
- $p/4\pi\varepsilon_0 r^2$
- $2p/4\pi\varepsilon_0 r^3$

---

2. The radius of a soap bubble whose potential is 16 Vis doubled. The new potential of the bubble will be

- 2 V
- 8 V
- 4 V
- 16 V

---

3. Electric charges of + 10μ, +5μC, - 3μC and + 8μC are placed at the corners of a square of side √2 m. The potential at the centre of the square is

- 1.8 V
- 1.8×10^5 V
- 1.8×10^6 V
- 1.8×10^4 V

---

4. Two plates are 2 em apart, a potential is applied between them, the electric field difference of 10 volts is applied between them, the electric field between the plates is

- 20 N/C
- 5 N/C
- 500 N/C
- 250 N/C

---

5. A simple pendulum has a metal bob, which is negatively charged. If it is allowed to oscillate above. a positively charged metallic piate, then its time period will

- Increases
- Become zero
- Decreases
- Remain the same

6. A hollow metal sphere of radius 5 em is charged such that the potential on its surface is 10 V. The potential at a distance of 2 em from the centre of the sphere

- Zero
- 4 V
- 10 V
- 10/3 V

---

7. A charged oil drop is to be held stationary between two plates separated by a distance of 25mm . If the mass of the drop is 5 x 10-15 kg and the charge on it is l0-18 C the potential to be applied between the two plates is (g = 10 ms-2)

- 125 V
- 2500 V
- 1250 V
- 450 V

---

8. A conducting sphere of radius R, and carrying a charge q is joined to a conducting sphere of radius 2R, and carrying a charge - 2q. The charge flowing between them will be

- q/3
- q
- 2q/3
- 4q/3

---

9. Two metal spheres of radii R1 and R2 are charged to the same potential. The ratio of charges on the spheres

- $\sqrt{R_1} : \sqrt{R_2}$
- $R^2_1 : R^2_2$
- $R_1 : R_2$
- $R^3_1 : R^3_2$

---

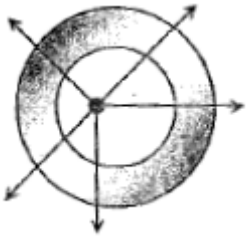
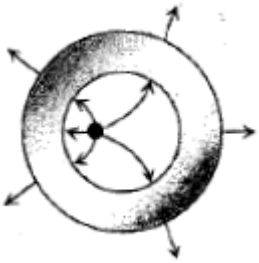
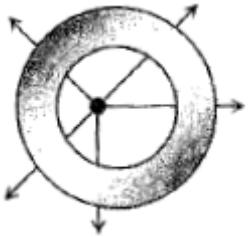
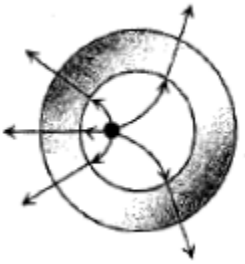
10. A radioactive source in the form of a metal sphere of radius 10-2 m, emits beta particles at the rate of 5 x 1010 partiCles per sec. The source is electrically insulated. How long will it take for it's potential to be raised by 2 volts, assuming 40% of the emitted beta particles escape the source

- 700 sec
- 700 μ sec
- 700 milli sec
- 700 n sec

11. A sphere of radius 1 em has potential of 8000 V, then energy density near its surface will be

- 64 x 10^5 J/m³
- 32 J/m³
- 8 x 10^3 J/m³
- 2.83 J/m³

12. A metallic shell has a point charge 'q' kept inside its cavity. Which one of the following diagrams correctly represents the electric lines of forces

- Image1. 
- Image3. 
- Image2. 
- Image 4. 

13. An electron enters between two horizontal plates separated by 2 mm and having a p.d. of 1000 V. The force on electron is. [JIPMER 1999]

- 8 X 10^{-12}N
- 8 X 10^{9}N
- 8 X 10^{-14}N
- 8 X 10^{14}N

14. A sphere of radius r is placed concentrically inside a hollow sphere of radius R. The bigger and smaller spheres are given charges Q and q respectively and are insulated. The potential difference between the two .spheres depends on

- Only charge q
- Both q and Q

- Only charge Q
- None on q and Q