# PHYSICS

# BOOKS - UNITED BOOK HOUSE

# MODEL PAPER SET-07

## Exercise

**1.** A solid and a hollow sphere of same diameter are charged to a same potential. Then—

A. More charge is in the hollow sphere

B. same charge in the both sphere

C. charge is only in hollow sphere

D. more chargers in solid sphere

**Answer:**

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**2.** The force acting between two point charges

in vacuum is 10 N. If the charges are placed in

a medium of relative permittivity 5, then the force acting between them will be—

A. $50N$

B. $2N$

C. $0.5N$

D. $10N$

**Answer:**

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**3.** n number of cells e.m.f of each is E and internal resistance is r connected in parallel or series combination and are connect to external resistance R.Same current flows through R in both cases. Then—

A. $R = nr$

B. $R = r$

C. $r = nR$

D. $R = \sqrt{nr}$

Answer:

**4.** A circular coil A is of radius R and current I, another circular coil 'B' is of radius 2R and current 2I.The ratio of magnetic field $B_A : B_B$ at their centre is—

A. $4 : 1$

B. $1 : 1$

C. $2 : 1$

D. $3 : 1$

**Answer:**

**5.** In a ferromagnetic substance a magnetising force field of $360Am^{-1}$ produces a magnetic flux density of 0.6 T. The magnetic susceptibility of the substance is—

    A. $1625$

    B. $1326$

    C. $2105$

D. 1914

**Answer:**

**6.** The dimensional formula of magnetic flux is

—

A. $[MLT^{-2}I^{-1}]$

B. $[ML^{-2}T^{-1}I^{-1}]$

C. $[ML^2T^{-1}I^{-2}]$

D. $\left[ML^2T^{-2}I^{-1}\right]$

**Answer:**

**7.** The current in a coil at time t is $I = t^2e^{-t}$.

The self inductance of the coil is $L = 2mH$.

How much time it will take to e.m.f. be zero?

A. $0\sec$

B. $2\sec$

C. 4 sec

D. 1 sec

**Answer:**

8. In a region of free space the average electric field of an electromagnetic wave is $9 \times 10^{-4} NC^{-1}$. What is the magnetic field in that region?

A. $3 \times 10^{-12}T$

B. $3 \times 10^{12}T$

C. $27 \times 10^{-4}T$

D. $27 \times 10^{-12}T$

**Answer:**

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**9.** A concave mirror of focal length 0.15 m

forms an in image doubled of the linear

dimension of the object. If the image is virtual then the object distance—

A. $0.075m$

B. $0.225m$

C. $0.30m$

D. $0.45m$

**Answer:**

**10.** The refractive index of the material of a double equiconvex lens id 1.5. IF the radius of curvature of he lens is R, then its focal length is

A. $3R$

B. $2R$

C. $4R$

D. $R$

Answer:

11. The energy of photon for the maximum wavelength of visible light is approximately

A. $7ev$

B. $3.2ev$

C. $1.6ev$

D. $1ev$

Answer:

**12.** The radioactive decay constant is $4.28 \times 10^{-4} year^{-1}$. What is the half life period of it?

    A. $2000 yrs$

    B. $1240 yrs$

    C. $63 yrs$

    D. $1620 yrs$

**Answer:**

**13.** The band gap between valence band and conduction band of a semiconductor is approximately—

A. $1MeV$

B. $10eV$

C. $1eV$

D. $0.1eV$

**Answer:**

**14.** The sky wave propagation is suitable for radiowaves of frequency—

A. upto 2MHZ

B. From 2MHZ to 20 MHZ

C. From 2MHZ to 30 MHZ

D. from 2MHZ to 50 MHZ

**Answer:**

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**15.** Define the unit of magnetic induction 'B'.

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**16.** The unit of which quantity is $Wb/A$?

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**17.** Write down lens maker's formula using the symbols as used.

**18.** Write the condition for destructive interference.

**19.** What is a junction diode?

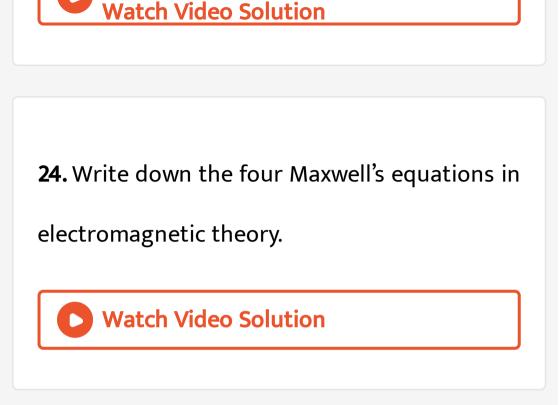**20.** Draw the I-V characteristic curve for a diode.

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**21.** For measuing a potential difference it is more logical to use a potentiometer than a voltmeter. Why?

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**22.** The ratio of cross section of two wires of same length and material is $1:4$. If the applied voltage at two ends of each wire is same, then what is the ratio of heat produced in the two wires?

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**23.** "There is no change in kinetic energy of a charge particle moving perpendicularly in a uniform magnetic field"— Why?

**24.** Write down the four Maxwell's equations in electromagnetic theory.

**25.** Given examples of production of electron from photon and production of photon from electron.

**26.** An electron is revolving in the third orbit of a hydrogen atom. What is its angular momentum? $\left[h = 6.6 \times 10^{-34} JS\right]$

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**27.** What is transducer? Name the three components in communication system.

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**28.** Find the capacitance of a parallel plate capacitor.

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**29.** The unit of which physical quantity corresponds to $J/C$ ? Is it scalar or vector?

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**30.** An electric dipole consists of two charges $\pm 20 \times 10^{-6}C$ separated by a distance $2 \times 10^{-3}m$. Find electric field at a distance 0.10 m from the centre of the dipoie on the perpendicular bisector.

**31.** State Biot Savarts law. Write down the expression of magnetic field at the centre of a current carrying circular coil of N turns.

**32.** In Young's Double Slit experiment, the: two sources, haye intensities in the ratio $n : 1$. What will be,,the ratio of maximum and minimumintensities?

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**33.** Establish Einstein's equation in photoelectric effect.

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**34.** The ground state energy of hydrogen atom is $-13.6eV$:- What does negative sign indicate?

**35.** The ground state energy of hydrogen atom is $-13.6eV$:- What is the energy required to none an electron from ground state to 1st excited state to the atom?

**36.** How is the p-n junction, used as a half wave rectifier and draw the input and output wave form for this rectification.

**37.** Emitter base connection is kept in forward bias — why?

**38.** Write down Kirchhoff's laws from electric circuit.
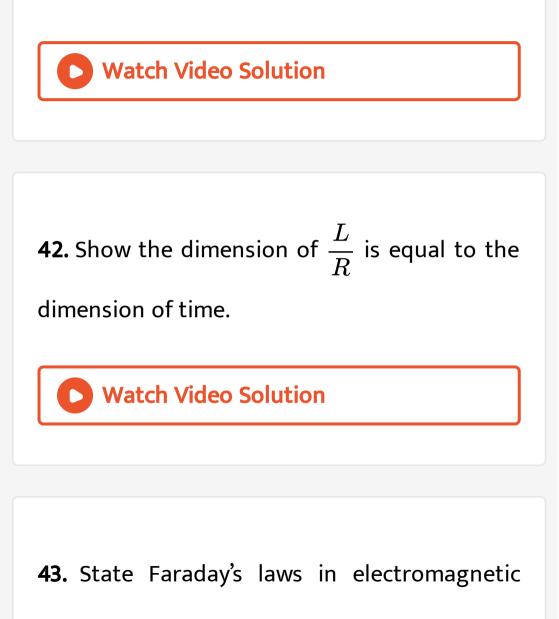
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**39.** A resistance $1000\Omega$ is connected to a $100V$ supply line. A voltmeter is connected across one end and the mid-point of the resistance and reads 40 V. Find the resistance of voltmeter.

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**40.** A Wheatstone network ABCD contains equal resistances P in the arms AB and CD and equal resistance Q in the arms AD and BC. A cell of e.m.f. 1 V and negligible resistance is connected across AC. Calculate the potential difference between B and D.
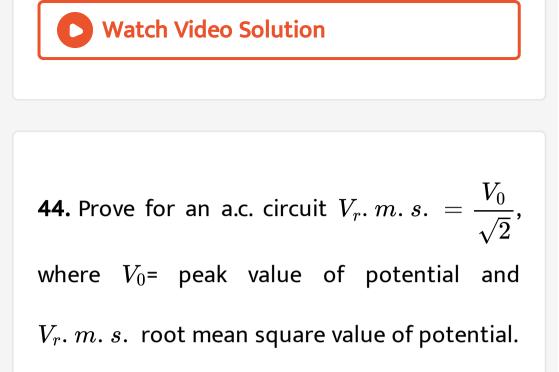
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**41.** A household circuit has a fuse 5A rating. Calculate the maximum number of bulbs rated

$60W - 220. V$ each, which can be connected in this household circuit?

**42.** Show the dimension of $\dfrac{L}{R}$ is equal to the dimension of time.

**43.** State Faraday's laws in electromagnetic induction.

**44.** Prove for an a.c. circuit $V_r.\, m.\, s. = \dfrac{V_0}{\sqrt{2}}$,

where $V_0$= peak value of potential and

$V_r.\, m.\, s.$ root mean square value of potential.

**45.** A rectangular coil of area $50 \times 10^{-4} m^2$

has 100 turns. A magnetic field $10^{-2} wb/m^2$

(uniform) is applied perpendicular to the

plane of the coil. The field is withdrawn in 40 ms. Find the e.m.f. inducedin the coil.

**46.** Focal lengths of two thin lenses kept in contant are $f_1$ and $f_2$. Prove that their equivalent focal length f is given by

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$$

**47.** A particle executes simple harmonic motion along principle axis of a convex lens of focal length f with amplitude 'a'. The centre point of the motion is at a distance 'b' from the lens. Find the amplitude of oscillation of the image.