



PHYSICS

BOOKS - UNITED BOOK HOUSE

MODEL PAPER SET-08



1. The total flux ϕ comes out of a sphere of radius r. Keeping the amount of charge constant, if the radius of the sphere is made

2r, how much flux will come out of the sphere

now?—

A. 2ϕ B. 4ϕ C. $\frac{\phi}{2}$ D. ϕ



2. A parallel plate air capacitor has a capacitance C and the distance between the plates is d.A metallic plate of thickness $\frac{d}{3}$ is introduced between the plates of the capacitor. The new capacitance will be—

A.
$$\frac{3}{2}C$$

B. $\frac{2}{3}C$

 $\mathsf{C}.\,C$

D. 3C



3. The electric field intensity E, current density

J and conductivity δ are related as—

A.
$$\delta = rac{E}{J}$$

B. $\delta = rac{J}{E}$
C. $\delta = JE$
D. $\delta = rac{1}{J}E$





4. A proton enters a magnetic field \overrightarrow{B} with velocity \overrightarrow{V} in a direction opposite to \overrightarrow{B} . The net magnetic force is—

A. Bev

B. - Bev

 $\mathsf{C}.\,Bv$

D. zero





5. At a certain place the horizontal component of earth's magnetic field is $\sqrt{3}$ times the vertical component. The angle of dip at that place is—

A. 30°

B. 60°

C. 45°

D. 75°

Answer:



6. The magnetic flux linked with a coil is ϕ = $\left(3t^2-2t+2
ight)$ mwb. What emf is induced in the coil at t = 1 sec?—

A. 4V

B. $4 imes 10^{-3}V$

 $\mathsf{C.}\,6V$

D. $6 imes 10^{-3}V$

Answer:



7. In an ac circuit voltage $V = 100 \sin(100t) V$ and current $I = 100 \sin(100t) \ mA$. The power dissipated in the circuit over a full cycle is—

A. $10^4 watt$

B.10watt

 ${\sf C.}\,2.5 watt$

D. 5watt

Answer:

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8. Dimension of $\mu_0 \in_0$ are—

A.
$$\left[LT^{\,-1}
ight]$$

- $\mathsf{B.}\left[L^{-2}T^{-2}\right]$
- C. $\left[L^2T^{-2}\right]$
- D. $\left[L^{-1}T
 ight]$

Answer:



9. 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

 $\mathsf{B.}\,2R$

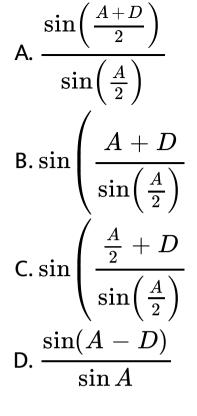
$\mathsf{C.}\,4R$

D. R

Answer:

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10. The refractive angle of prism is A. A ray is incident normally on one of the refracting faces of a prism and emerges out. If D be the deviation of the ray then refractive index of the material of the prism is—





11. The amount of energy released in the fisson

of $_{92}U^{235}$ is—

A. 200 ev

 $\mathsf{B.}\,20ev$

 $\mathsf{C.}\,200 kev$

D. 200 Mev

Answer:

12. The magnitude of saturated photoelectric

current depends upon —

A. Frequency of radiation

B. intensity of radiation

C. work function

D. stopping potential

Answer:

13. For a transistor used in common emitter configuration, $\alpha = 0.9$. What is the change in collector current when the base current changes by $2\mu A$?

A. $1\mu A$

 $B.0.9\mu A$

C. $30\mu A$

D. $18\mu A$



14. As radio waves of low frequencies cannot be transmitted to long distances, a high frequency carrier signal is superposed on it.This process is called—

A. Amplification

- **B.** Rectification
- C. Modulation
- D. Oscillation

Answer:



15. An electron is moving along X axis and a magnetic field is directed along Y axis. What will he the direction of magnetic force acting on the electron?

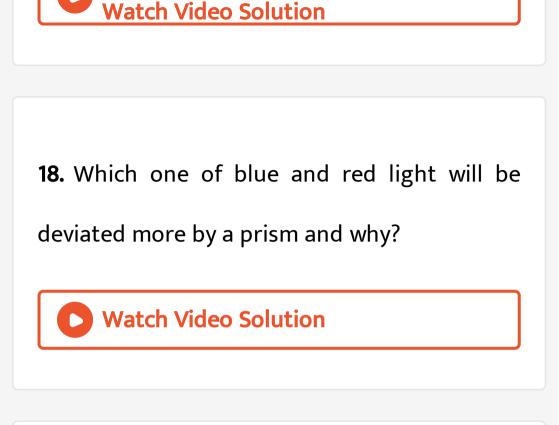


16. Two infinitely long conductors are placed at a separation r and each carrying a current i. What is the magnetic field at a point midway between the conductors when the currents are in opposite directions?

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17. When an aeroplane flies horizontantally, a potential difference is developed across the two ends of its wings. Why?

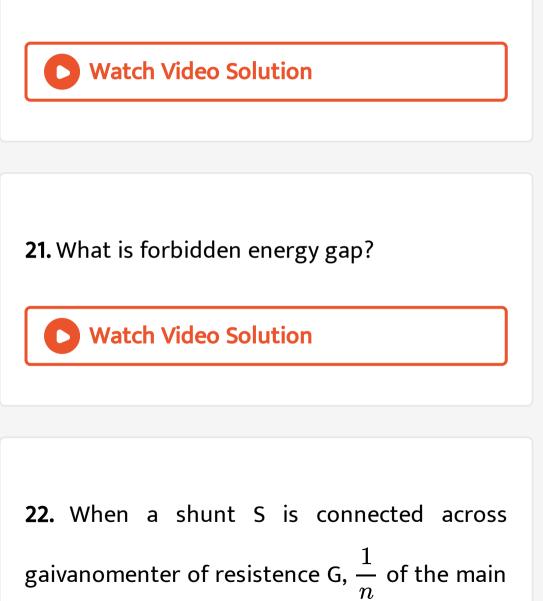




19. What is polarisation of light?

20. Write down the symbol and truth table OR

gate.



current passes through the galvanometer.

What is the relation between S and G?



23. Why is potentiometer preferred to voltmeter for the measurement of emf of a cell? Explain.



24. How does the magnetic moment of a circular coil vary with its radius?Watch Video Solution

25. How can you find the direction of the

magnetic moment?



26. A long wire carries a current of 90 A in the east to west direction. What is the magnitude and direction of magnetic field due to the current I.5m below the line?

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27. In a piece of ancient wood C -14 and C - 12 are present. the ratio of C -14 and C - 12 in this wood at present is $\frac{1}{8}th$ part of their ratio in

the ancient wood. Half life of C^{14} is 5570Y.

What is the age of the wood?



28. What are electromagnetic waves? Write down the relation connecting electric vector, magnetic vector and the direction of propagation of an electromagnetic wave.

29. A plane electromagnetic wave is moving along X-direction in free space. At a certain location in a moment the electric field vector $\vec{E} = E_0 \sin(wt - kx)\hat{j}$, where $E_0 = 3$ V/m. Write down the expression for the magnetic field vector \vec{B} in that location.

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30. On the X-Y plane two point charges +qand -q are placed at positions (0, L) and (0,-L) respectively. Find an expression for the intensity of the electric field at a point (0, y) where $y \gg L$. Express the electric field in terms of the dipole moment so formed.



31. What is potential gradient? The electric potential is found to depend on X only and is given by $V(x) = ax - bx^2$, where a and b are constants. Find the positions on the X - axis where electric field intensity is zero.



32. The parallel plate capacitors of capacitances C and 2C are connected in parallel and charged to a potential difference V by a battery. The battery is the disconnected and the space between the plates of capacitance C is filled with a dielectric of dielectric constant K. Find the potential difference across the combination now.

33. Write down the Biot - Savart law in the vector form. Hence find the magnetic field intensity in magnitude and direction at the centre of a circular coil carrying a current.

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34. What is the time taken by light to travel through a glass slab of thickness 'd' and refractive index μ ?

35. Write down the condition for minimum deviation in prism.

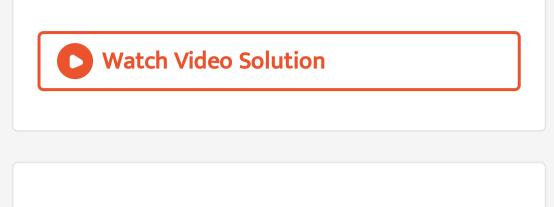
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36. Calculate the refracting angle of a prism $(\mu = \sqrt{2})$ if a ray of light incident normally on one of the face emerges from the other face just grazing it.

37. In double slit experiment, the distance between two slits is 0.6 mm and they are illuminated by blue cadmium light $\left(x=4800\overset{\circ}{A}
ight)$. How far from the plane of the slit should a screen be placed so that the fringe width on the screen would be 0.16mm? Watch Video Solution

38. A short sighted person can see objects at 20cm from his eyes. What type of lens is to be



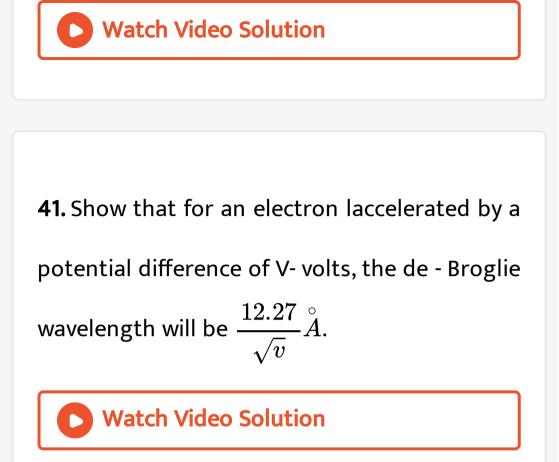


39. What is threshold frequency in connecting

with photoelectric effect?

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40. Will photoelectrons be emitted by copper plate of work function 4.4eV when illuminated by visible light?



42. Show that kinetic energy of an electron in

the first Bohr orbit is numerically half of its

potential energy.





43. Wahat is a p-n junction diode? Draw the circuit diagram of a full wave rectifier using p-n junction diodes. Show the imput and output voltage waveforms by a schematic graph.



44. What is a photodiode? Draw thel-V characteristic curve of a photodiode. Mention one use of photodiode.



45. Prove that current density of a metallic conductor is directly proportional to the drift speed of electrons.

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46. Define mobility of free electrons.

47. The potential difference between the terminals of a cell, in an open circuit was 2.5 volt and when it was connected through a resistance of 5 ohm, the potential difference fell to 1.5v. Find the internal resistance of the cell.



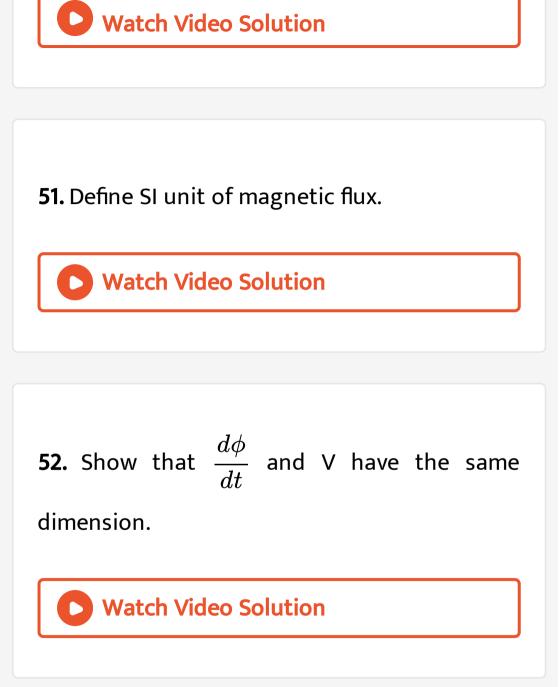
48. State and explain Kirchhoff's laws for electrical circuits.



49. What is the principle of potentiomenter?

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50. A potentiometer wire has a length 10m and a resistance of 4 ohm. A cell of emf 2V and a resistance box are connected in series with it. Calculate the resistance to be introduced in the box, so as to get a potential gradient of $0.1Vm^{-1}$.



53. A conducting wire of length I is rotating with angular velocity w in a magnetic field B perpendicular to it. Prove that the induced e.m.f. at the two ends of the conducting wire is $e = \frac{1}{2}Bwl^2$.

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54. The electric mains in the house are marked '220v, 50Hz` Write down the equation for instantaneous voltage.





55. How can an LCR circuit be made purely

resistance?



56. A resistance of 400Ω and a capacitance of reactance 200Ω are connected in series to a 220V, 50Hz a.c source. If the current in the circuitsis 0-49A. Find voltage across resistor and capacitor

57. A resistance of 400Ω and a capacitance of reactance 200Ω are connected in series to a 220V, 50Hz a.c source. If the current in the circuits is 0-49A. Find value of the inductance required so that voltage and current are in phase.

58. Derive an expression for the equivalent focal length for two thin convex lenses in contact.



59. The distance between an object and a screen is 2m. Can an image of an object be obtained bn the screen with the help of a convex lens whose power is 1.25D?



