



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER-05 (SOLVED)

Part I

1. An electric dipole is placed at an alignment angle of 30° with an electric field of 2×10^5 N

C^{-1} . It experiences a torque equal to 8 N m.

The charge on the dipole if the dipole length is 1 cm is

A. 4mC

B. 8mC

C. 5mC

D. 7mC

Answer: B



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2. Dielectric constant of metals is

A. 1

B. gre greater then 1

C. zero

D. infinite

Answer: D



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3. Two wires of A and B with circular cross section made up of the same material with equal lengths. Suppose $R_A = 3R_B$, then what is the ratio of radius of wire A to that of B ?

A. 3

B. $\sqrt{3}$

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{3}$

Answer: C



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4. A circular coil of radius 5 cm and has 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is

A. $1.0 \text{ amp} - \text{m}^2$

B. $1.2 \text{ amp} - \text{m}^2$

C. $0.5 \text{ amp} - \text{m}^2$

D. $0.8 \text{ amp} - \text{m}^2$

Answer:





5. A straight conductor carrying a current I , is split into a circular loop of radius r as shown in the figure. The field at the centre O of the circle, in tesla is



A. $\frac{\mu_0 I}{2r}$

B. $\frac{\mu_0 I}{2\pi r}$

C. $\frac{\mu_0 I}{\pi r}$

D. zero

Answer: D



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6. The flux linked with a coil at any instant t is given by $\Phi_B = 10t^2 - 50t^2 - 50t + 250$. The induced emf at $t = 3\text{ s}$ is

A. -190 V

B. -10 V

C. 10 V

D. 190 V

Answer: B



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7. Quantity that remains unchanged in a transformer is

A. (a) voltage

B. (b) current

C. (c) frequency

D. (d) none of these

Answer: C



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8. the electric and the magnetic field, associated with an electromagnetic wave, propagating along X axis can be represented by

A. $\vec{E} = E_0 \hat{j}$ and $\vec{B} = B_0 \hat{k}$

B. $\vec{E} = E_0 \hat{k}$ and $\vec{B} = B_0 \hat{j}$

C. $\vec{E} = E_0 \hat{i}$ and $\vec{B} = B_0 \hat{j}$

D. $\vec{E} = E_0 \hat{j}$ and $\vec{B} = B_0 \hat{j}$

Answer: B



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9. A ray of light strikes a glass plate at an angle 60° . If the reflected and refracted rays are perpendicular to each other, the refractive index of the glass is,

A. $\sqrt{3}$

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

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

D. 2

Answer: A



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10. For light incident from air onto a slab of refractive index 2. Maximum possible angle of refraction is,

A. 30°

B. 45°

C. 60°

D. 90°

Answer: A



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11. A light of wavelength 500 nm is incident on a sensitive plate of photoelectric work function 1.235 eV. The kinetic energy of the

photo electrons emitted is be (Take $h = 6.6 \times 10^{-34}$ Js)

A. 0.58 eV

B. 2.48 eV

C. 1.24 eV

D. 1.16 eV

Answer: C



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12. In a hydrogen atom, the electron revolving in the fourth orbit, has angular momentum equal to

A. h

B. $\frac{h}{\pi}$

C. $\frac{4h}{\pi}$

D. $\frac{2h}{\pi}$

Answer: D



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13. The barrier potential of a silicon diode is approximately.

A. 0.7V

B. 0.3V

C. 2.0V

D. 2.2V

Answer: A



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14. The signals is affected by noise in communication system

A. At the transmitter

B. At the modulator

C. In the channel

D. At the receive

Answer: C



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15. An atom contains _____ particles such as protons , neutrons and electrons .

- A. Higgs particle
- B. Einstein particle
- C. Nanoparticle
- D. Bulk particle

Answer: A



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1. Define 'electrostatic potential'.



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2. Define temperature coefficient of resistance.



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3. The self-inductance of an air-core solenoid is 4.8 mH. If its core is replaced by iron core, then its self-inductance becomes 1.8 H. Find out the relative permeability of iron.



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4. What is meant by Fraunhofer lines?



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5. What is power of a lens?



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6. Calculate the cut-off wavelength and cutoff frequency of x-rays from an x-ray tube of accelerating potential 20,000 V.



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7. What is mass defect?



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8. Simplify the Boolean identify

$$AC+ABC=AC$$



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9. Whatdo you mean by Internet of Things?



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1. Give the relation between electric field and electric potential .



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2. A copper wire of $10^{-6}m^2$ are of cross section, carries a current of 2A. If the number of electrons per cubic meter is 8×10^{28} , calculate the current density and average drift velocity.



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3. Compare dia, para and ferromagnetism.



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4. State Faraday's laws of electromagnetic induction.



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5. Why does sky appear blue?



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6. Write down the postulates of Bohr atom model.



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7. State De Morgan's first and second theorems.



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8. Write down the advantages and limitations of amplitude modulation (AM)? Advantages of AM



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9. What are black holes?



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1. Derive an expression for the torque experienced by a dipole due to a uniform electric field.



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2. Explain the determination of the internal resistance of a cell using voltmeter.



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3. What is the magnetic field along the axis and equatorial line of a bar magnet ?



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4. How will you induce an emf by changing the area enclosed by the coil? Induction of emf by changing the area of the coil:



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5. Write down Maxwell equations in integral form.



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6. Obtain lens maker's formula and medium its signification. Lens maker's formula and lens equation:



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7. Briefly discuss the observations of Hertz, Hallwachs and Lenard. Hertz observation:



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8. Obtain the law of radioactivity. Law of radioactive decay



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9. Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output wave form.



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10. Explain the three modes of propagation of electromagnetic waves through space.



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