



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 15 (UNSOLVED)

Part I

1. Which charge configuration produces a uniform electric field?

A. point charge

B. infinite uniform line charge

C. uniformly charged infinite plane

D. uniformly charged spherical shell

Answer:



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2. In Joule's heating law, when I and t are constant, if the H is taken along the y axis and I^1 along the x axis, the graph is

A. Straight line

B. parabola

C. circle

D. ellipse

Answer:



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3. Electromotive force is most closely related to

- A. electric field
- B. magnetic field
- C. potential difference
- D. mechanical force

Answer:



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4. A flat dielectric disc disc of radius R carries an excess charge on its surface. The surface charge density is σ . The disc rotates about an

axis perpendicular to its plane passing through the center with angular velocity ω .

Find the magnitude of the torque on the disc if it is placed in a uniform magnetic field whose strength is B which is directed perpendicular to the axis of rotation

A. $\frac{1}{4}\alpha\omega\pi BR$

B. $\frac{1}{4}\alpha\omega BR^2$

C. $\frac{1}{4}\omega\pi BR^3$

D. $\frac{1}{4}\omega\pi BR^4$

Answer:



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5. $\frac{20}{\pi^2} H$ inductor is connected to a capacitor of capacitance C . The value of C in order to impart maximum power at 50 Hz is

A. $50\mu F$

B. $0.5\mu F$

C. $500\mu F$

D. $5\mu F$

Answer:



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6. In an LCR series circuit, at resonance

A. is always in phase with the voltage

B. always lags behind the voltage

C. always leads the voltage

D. may lead or lag behind the voltage

Answer:



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7. If the amplitude of the magnetic field is $3 \times 10^{-6} \text{ T}$, then amplitude of the electric field for a electromagnetic waves is

A. 100 Vm^{-1}

B. 300 Vm^{-1}

C. 600 Vm^{-1}

D. 900 Vm^{-1}

Answer:



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8. An object is placed in front of a convex mirror of focal length $2f$ and the maximum and minimum distance of an object from the mirror such that the image formed is real and magnified.

A. $2f$ and c

B. c and ∞

C. f and O

D. None of these

Answer:



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9. Which of the following is used in optical fibres?

- A. Total internal reflection
- B. Diffraction
- C. Refraction
- D. Scattering

Answer:



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10. Two radiations with photon energies 0.9 eV and 3.3 eV respectively are falling on a metallic surface successively. If the work function of the metal is 0.6 eV , then the ration of maximum speeds of emitted electrons will be

A. $1 : 4$

B. $1 : 3$

C. 1:1

D. 1:9

Answer:



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11. The mass of a ${}^3_7\text{Li}$ nucleus is 0.042 u less than the sum of the masses of all its nucleons.

The binding energy per nucleon of ${}^3_7\text{Li}$ nucleus is nearly

A. 46 MeV

B. 5.6 MeV

C. 3.9 MeV

D. 23 MeV

Answer:



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12. The allowed energy for the particle for a particular value of n is proportional to

A. a^{-2}

B. $a^{-3/2}$

C. a^{-1}

D. a^2

Answer:



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13. When a transistor is fully switch on , it is said to be

A. shorted

B. saturated

C. Cut-off

D. Open

Answer:



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14. The output transducer of the communication system converts the radio signals into _____

A. Sound

B. Mechanical energy

C. Kinetic energy

D. None of above

Answer:



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15. The materials used in Robotics are

A. Aluminium and silver

B. Silver and gold

C. Copper and gold

D. Steel and aluminium

Answer:



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Part ii

1. What is meant by quantisation of charges ?



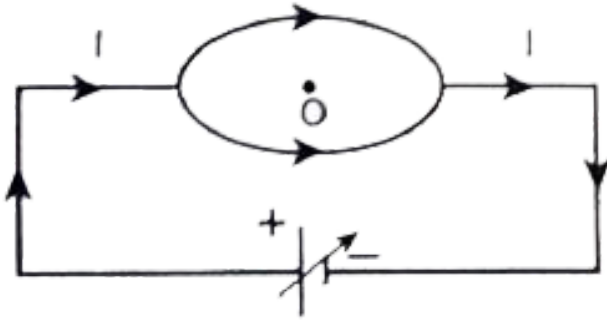
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2. Resistance of a material at $10^{\circ}C$ and $40^{\circ}C$ are 45Ω and 85Ω respectively. Find its temperature co-efficient of resistance



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3. What is the magnetic field at the center of the loop shown in figure ?



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4. How will you define RMS value of an alternating current ?



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5. The relative magnetic permeability of the medium is 2.5 and the relative electrical permittivity of the medium is 2.25 Compute the refractive index of the medium.



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6. What is hypermetropia?



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7. Calculate the average atomic mass of chlorine if no distinction is made between its different isotopes?



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8. Discuss the biasing polarities in an NPN and PNP transistors.



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9. What do you mean by Internet of Things?



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Part iii

1. A sample of HCl gas is placed in a uniform electric field of magnitude $3 \times 10^4 \text{ N} \cdot \text{C}^{-1}$.

The dipole moment of each HCl molecule is

$3.4 \times 10^{-39} \text{ Cm}$. Calculate the maximum

torque experienced each HCl molecule.



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2. State Joule's law of heating.



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3. Explain Curie's law of magnetism.



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4. How is Eddy current produced? How do they flow in a conductor ?



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5. Mention the differences between interference and diffraction.



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6. When light of wavelength 2200 \AA falls on Cu, photo electrons are emitted from it. Find (i) the threshold wavelength and (ii) the stopping potential. Given : the work function for Cu is $\phi_0 = 4.7 \text{ eV}$.



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7. Explain the results of Rutherford α -particle scattering experiment.



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8. What are extrinsic semiconductor?



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9. Write down the application of Nano technology?



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1. Obtain the expression for the energy stored in a parallel plate capacitor.



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2. Describe the microscopic model of current and obtain general form of Ohm's law.



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3. Explain the principle and working of a moving coil galvanometer .



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4. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.



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5. Write short notes on (a) microwave



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6. Prove laws of refraction using Huygen's principle.



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7. List out the laws of photoelectric effect.



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





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9. Sketch the static characteristics of a common emitter transistor and bring out the essence of input and output characteristics.



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10. Fiber optic communication is gaining popularity among the various transmission media -justify.



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