PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER -12

Part I

1. Two metallic spheres of radii 1 cm and 3 cm are given charges of $-1 \times 10^{-2} C$ and

5×10^{-2} C respectively . IF these are connected by a conducting wire the final charge on the bigger sphere is ....

A. 3×10^{-2} C

B. $4 \times 10^{-2}C$

C. $1 \times 10^{-2}C$

D. $2 \times 10^{-2}C$

Answer: A

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2. A wire connected to a power supply of 230V has power dissipation P_1. Suppose the wire is cut into two equal pieces and connected parallel to the same power supply. In this case power dissipation is P_2. The ration $\dfrac{P_2}{P_1}$ is.

    A. 1

    B. 2

    C. 3

    D. 4

Answer: D

3. Two short bar magnets have magnetic moments 1.20 Am^2 and 1.00 Am^2, respectively .

They are kept on a horizontal table parallel to each other with their north poles pointing towards the south . They have a common magnetic equator and are separated by a distance of 20.0 cm. The value of the resultant horizontal magnetic induction at the midpoint O of the line joining their centers is (

Horizontal components of Earth's magnetic induction is $3.6 \times 10^{-5} Wbm^{-2}$).

A. $3.60 \times 10^{-5} Wbm^{-2}$

B. $3.5 \times 10^{-5} Wbm^{-2}$

C. $2.56 \times 10^{-4} Wbm^{-2}$

D. $2.2 \times 10^{-4} Wbm^{-2}$

Answer: C

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4. Nickel shows ferromagnetic property at room temperature. If the temperature is increased beryond Curie temperatue,then it will show

A. antiferromagnetism

B. no magnetic property

C. diamagnetism

D. para magentism

Answer: D

5. An inductor 20 mH , a capacitor $50\mu F$ and a resistor 40Ω are connected in series across a source of emf v = 10 sin 340 t. The power loss in AC circuit is ....

A. $0.76W$

B. $0.89W$

C. $0.46W$

D. $0.67W$

Answer: C

6. The core of a transformer is laminated to reduce.

    A. Copper loss

    B. Magnetic loss

    C. Eddy current loss

    D. Hysteresis loss

Answer: C

7. A radiation of energy E falss normally on a perfectly reflecting surface. The momentum transferred to the surface is

A. $\dfrac{E}{c}$

B. $2\dfrac{E}{c}$

C. Ec

D. $\dfrac{E}{c^2}$

Answer: B

8. Stars twinkle due to

    A. reflection

    B. total internal reflection

    C. refraction

    D. polarisation

Answer: C

9. An astronomical telescope has a large aperture to,

    A. reduce spherical aberration

    B. have high resolution

    C. increase span of observation

    D. have low dispersion

Answer: B

10. Photons of wavelength λ are incident on a metal. The most energetic electrons ejected from the metal are bent into a circular arc of radius R by a perpendicular magnetic field having magnitude B. The work function of the metal is.........................

A. $\dfrac{hc}{\lambda} - m_e + \dfrac{e^2 B^2 R^2}{2m_e}$

B. $\dfrac{hc}{\lambda} + 2m_e \left[\dfrac{eBR}{2m_e}\right]^2$

C. $\dfrac{hc}{\lambda} - m_e c^2 - \dfrac{e^2 B^2 R^2}{2m_e}$

D. $\dfrac{hc}{\lambda} - 2m_e \left[\dfrac{eBR}{2m_e}\right]^2$

Answer: A

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11. The nucleus is approximately spherical in shape. Then the surface area of nucleus haviing mass number A varies as.

A. $A^{2/3}$

B. $A^{4/3}$

C. $A^{1/3}$

D. $A^{5/3}$

Answer: A

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12. If an α- particle collides head on with a nucleus, what is impact parameter?
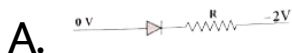
A. zero
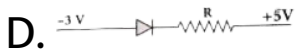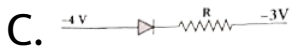
B. infinite

C. $10^{-10}m$

D. $10^{10}m$

Answer: A

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13. Which of the following represent forward

bias diode ?

A.

B.

C. −4 V   R   −3V

D. −3 V   R   +5V

Answer: A

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14. The internationally accepted frequency deviation for the purpose of FM broadcasts.

A. 75 kHz

B. 68 kHz

C. 80 kHz

D. 70 kHz

Answer: A

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15. A suspended nano wire is a wire that is produced in............

A. Air medium

B. Vaccum

C. Low vaccum chamber

D. High vaccum chamber

Answer: D

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Part Ii

1. When two objects are rubbed with each other approximately a charge of 50 nC can be produced in each object . Calculate the

number of electrons that must be transferred to produce this charge.

2. State the principle of potentiometer.

3. Define Ampere :

4. Define electric resonance.

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5. What is greenhouse effect ? Explain.

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6. What are mirage and looming?

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7. Define the term 'stopping potential ' in relation to photoelectric effect.

8. The radius of the 5th orbit of hydrogen atom is 13.25Å. Calculate the wavelength of the electron in the 5th orbit.

9. Give the factors that are responsible for transmission impairments.

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Part Iii

1. Consider a point charge +q placed at the origin and another point charge -2p placed at a distance of 9 m from the charge $+q$.

Determine the point between the two charges at which electric potential is zero.

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2. Sate the applications of Seeback effect.

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3. Define Voltage sensitivity ?

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4. An iduced current of 2.5 m flows throug a single conductor of resistance 100Ω. Find out the rate at which the magnetic flux is cut by the conductor.

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5. Explain the reason for glittering of diamond

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6. Calculate the maximum kinetic energy and maximum velocity of the photoelectrons emitted when the stopping potential is 81V for the photoelectric emission experiment.

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7. What is meant by activity or decay rate? Give its unit.

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8. How electron -hole pairs are created in a semiconductor material ?

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9. What is skip zone or skip area.

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Part Iv

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

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2. Compute the torque experimenced by a magnetic needle in a uniform magnetic field.

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3. 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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4. Write short notes on (a) Infrared radiation (b) Ultraviolent radiation (c) Gamma radiaiton

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5. Derive the equation for thin lens and obtain its magnification .

6. Describe briefly Davisson - Germer experiment which demonstrated the wave nature of electrons.

7. Discuss the alpha decay process with example.

8. Explain the formation of PN junction diode. Discuss its V - I characteristics.

9. Elaborate on the basic elements of communication system with the necessary block diagram.

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10. Comment on the recent advancement in medical diagnosis and therapy.

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