PHYSICS

BOOKS - UNITED BOOK HOUSE

MODEL PAPER SET-01

Exercise

1. Two equal point charges are placed on x=-a and x=+a on the x=axis. Another point charge Q is placed on the origin. IF this charge is

displaced a small distance x along x-axis, then the change of potential energy approximately will be proportional to

A. x

B. x^2

C. x^3

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

Answer:

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2. A capacitor of 4 μF is charged to 400 V. Now the two plates are connected with a resistance of 2 $K\Omega$. What will be the amount of heat through the resistance?

A. 0.16 J

B. 0.32 J

C. 0.64 J

D. 1.28 J

Answer:

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3. Resistance of which substance is decreased with increasing temperature?

A. Cu

B. Carbon

C. Constantan

D. Silver

Answer:

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4. A thin and malleable wire is kept on a table in rectangular form and a strong current is passed through the wire. The shape of the wire will be

A. Triangular

B. circular

C. Hexagonal

D. rectangular

Answer:

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5. Which term is related to the fact that all the domains are aligned to the direction of applied magnetic field for ferromagnetic substance-

A. permability

B. co -ercivity

C. retentivity

D. saturation

Answer:

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6. The power factor of a series L-C-R circuit at resonance

A. 1

B. 0.5

C. zero

D. depends on L,C and R.

Answer:

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7. It is required to show the transverse nature of electromagnetic radiation

A. polarisation experiment

B. diffraction experiment

C. Interference experiment

D. experiment of optical activity

Answer:

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8. In lens displacement method the magnified and reduced size of image are x_1 and x_2 respectively. The Origional size of the object will be

A. $\sqrt{x_1 x_2}$

B. $x_1 x_2$

C. $x_1^2 x_2$

D. $x_1^2 - x_2^2$

Answer:

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9. The focal length of objective lens of astronomical telescope is

A. half of the focal length of eye piece

B. equal to the focal length of eye piece

C. less than the focal length of eye piece

D. greater than the focal length of eye piece.

Answer:

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10. Which of the following electromagnetic waves is of the lowest wave length?

A. γ-ray

B. x-ray

C. UV ray

D. Infrared ray

Answer:

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11. For a given kinetic energy the wavelength of which wave is the lowest?

A. Electron

B. Proton

C. Neutron

D. Deuteron

Answer:

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12. If the electron in a hydrogen atom jumps from an orbit with level $n_1 = 2$ to an orbit with level $n_2 = 1$ the emitted radiation has a wavelength given by

A. $\lambda = \frac{5}{3R}$

B. $\lambda = \frac{4}{3R}$

C. $\lambda = \frac{R}{4}$

D. $\lambda = \frac{3R}{4}$

Answer:

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13. What is the limitaion of Ampere's circuital law?

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14. Wrtire down the dismensional formula for induced e.m.f?

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15. A cahrged particle is released from rest in a region of steady and uniform electric and magnetic and magnetic fields, which are parallel to each other what will be the nature of the path followed by the charged particle?

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16. 220-V,50 Hz a.c. source is supplied to a circuit which have a pure resistance. What will be the phase difference between the current and supply voltage?

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17. In which condition a p-n junction diode works as open switch ?

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18. Mention practical importance of zenor diode in a laboratory.

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19. Why do we prefer a potentiometer with longer wire?

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20. An electric bulb is connected to battery of e.m.f. 10V and 0.01 A current is flowing through the bulb. But when it is connected to 220V mains then the cureent is 0.05 A. Explain this apparent discrepancy with ohm's law.

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21. The mass of an electron of charge 'e' is 'm'. The electron is moving in a straight line accelarated by a potential difference V. If enters a crossed field where E and B are the

'intensities' of electric and magnetic fields respectively acting matually perpendicular top the direction of motion of elctron . Prove that for no deflection of the electron, $\frac{e}{m} = \frac{E^2}{2VB^2}$.

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22. Which of the following relation represent Biot-Savart's law?

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23. Which of the following, if any, can act as a source of electromagnetic waves?

A charge moving with a constant velocity.

Give reason.

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24. Which of the following, if any, can act as a source of electromagnetic waves?

A charge moving in a circular orbit.

Give reason.

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25. Which of the following, if any, can act as a source of electromagnetic waves?

A charge at rest.

Give reason.

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26. Hydrogen atom has one elctron. How then many lines are originated in hydrogen spectrum?

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27. Explain how radioactive nuclei can emit β-particle even though atomic nuclei do not contain these particles.

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28. What do you mean by modulation index? What is its maximum and minimum value?

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29. State Gauss's law in electrostatics. Proof of gauss law.

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30. Derive an expression for the torque on a rectangular coil of area A carrying. A current I and placed in a uniform magnetic field B. Indicate the direction the torque acting on the loop.

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31. State Ampere's circuital law. Using this law obtain an expression for the intensity of the magnetic field on the axis of a toroidal solenoid for a current of I ampere.

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32. An object at the bottom of a tank containing two different liquids (which do not mix with each other) is seen vertically from

above . Prove the apparent depth pf the object is $\frac{d_1}{\mu_1} + \frac{d_2}{\mu_2}$ if the lower and upper liquids are respectively of depths d_1 and d_2 and R.I. μ_1 and μ_2.

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33. Describe Davission and Germer experiment to establish the wave nature of electrons. Draw a labelled diagram of the apparatus used.

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34. When a certain metalic surface is illuminated with monochromatic light of wavelength λ the stopping potential is V_0 When the same surface is illuminated with light of wavelength 2λ, the stopping potential $\frac{V_0}{4}$./ If the velocity of light in air is C, then find threshold frequency. Write down de Brogile hypotesis.

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35. State the law of radioactive decay. A radioactive material decays $\frac{3}{4}$ th in $\frac{3}{4}$ sec. Find half life period of the material.

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36. Draw Wheatstone bridge circuit and write down the balancing condition of it. In a meter bridge the balance point is found to be at 40 cm from one end when the resistor at the end is 10Ω. Find the resistance at the other side. If

the galvanometer and the cell are interchanged at the balance condiotion, would it affect the current through the galvanometer?

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37. An A.C. generator has smaller resistance than that of the resistive load. To increase the energy supply to the load from the generator a tranformer is to be connected between the

two. Should it be a step-up or step-down transformer?

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38. What is the time taken by A.C. of 50 Hz to invert its direction?

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39. Mention three differences between interference and diffraction. Why is the size of

the objective of astronomical telescope generally large?

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40. The ratio of the intensities of two coherent sources is 25:16. After interference what will b the ratio of maximum an minimum intesities?

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