PHYSICS

BOOKS - UNITED BOOK HOUSE

MODEL PAPER SET-09

Exercise

1. The energy of a photon of wavelength λ is—

A. $h\lambda/c$

B. hc/λ

C. λ/hc

D. $c/h\lambda$

Answer:

2. Correct value of dielectric constant 'K' in the relation given is—

A. $K = E/Eo$

B. $K = Eo/E$

C. $K = E.\,Eo$

D. $K = E + Eo$ where E and Eo are electric field is the medium with dielectrics and in air respectively.

Answer:

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3. Two protons are projected in a magnetic field 'B' with velocities 'V'and 2V perpendicular to the direction of field.Their cyclotron frequencies are fA and fB.Then the correct relation between them is—

A. $fA > fB$

B. $fA = fB$

C. $fA < fB$

D. $fA = fB = 0$

Answer:

4. A parallel plate capacitor has capacitance C. If it is equally filled with parallel layers of materials of dielectrics K_1 and K_2 —

A. $k_1 + k_2$

B. $\dfrac{K_1 K_2}{K_1 - K_2}$

C. $\dfrac{K_1 + K_2}{K_1 K_2}$

D. $\dfrac{2K_1 K_2}{K_1 + K_2}$

Answer:

5. Farad per meter is the S.I. unit of—

A. Capacitance

B. Permittivity

C. permeablity

D. inductance

Answer:

6. Photoelectric effect proves that light is—

A. A. a wave

B. B. a particle

C. C. both particle and wave

D. D.NONE

Answer:

7. Emitter of a transistor is—

    A. heavily doped

    B. lightly doped

    C. modertly doped

    D. not doped

Answer:

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8. What is the ratio of diameter of first Bohr's orbit in He^+ and H atom?

    A. $2:1$

    B. $1:2$

    C. $4:1$

    D. $1:4$

Answer:

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9. A carrier wave of amplitude 200v is used for modulation of a sine wave of 40v and I KHz. Modulation index—

A. A. 0.8

B. B. 0.4

C. C. 0.6

D. D. 0.2

Answer:

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10. Dimension of magnetic flux (ϕ) is—

A. $\left[ML^{-2}T^3A^{-1}\right]$

B. $\left[ML^2T^{-2}A^{-1}\right]$

C. $\left[ML^{-2}T^{-2}A^{-1}\right]$

D. $\left[ML^2T^{-2}A\right]$

Answer:

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11. The expression for electromagnetic wave is —

A. $c = \mu_o \in_o$

B. $c = \sqrt{\mu_o \in_o}$

C. $c = \dfrac{1}{\sqrt{\mu_o \in_o}}$

D. $c = 2\sqrt{\mu_o \in_o}$

Answer:

12. A convex lens of focal length 80 cm and a concave lens of focal length 50cm are placed in contact. The resulting will be—

A. $-6.5D$

B. $+6.5D$

C. $-0.75D$

D. $+7.5D$

Answer:

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13. A particle is moving with kinetic energy E. It's de Broglie wavelength is—

A. $h\sqrt{2mE}$

B. $\dfrac{\sqrt{2mE}}{h}$

C. $\dfrac{h}{\sqrt{2mE}}$

D. $\dfrac{hE}{\sqrt{2m}}$

Answer:

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14. Prepare the truth table of NOR gate.

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15. Write the decimal equivalent of $(11011)_2$.

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16. A coil of metal wire is stationary in a non-uniform magnetic field. Is an e.m.f. Induced in the coil? Give reason.

17. What is the value of resistance offered by a junction diode when it is in reverse bias?

18. Ratio of lengths of two wires of same material is $2:3$ and ratio of areas of cross section is $1:2$. Find the ratio of their drift velocities when:- they.are connected in series

19. Ratio of lengths of two wires of same material is $2:3$ and ratio of areas of cross section is $1:2$. Find the ratio of their drift velocities when:- they are connected in parallel.

20. Calculate the magnetic flux through a circular loop of diameter 40cm when placed

vertically at a place Where horizontal component of the earth's magnetic field is $2.0 \times 10^{-5} T$.

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21. Out of ammeter, voltmeter and galvanometer, which one has the lowest resistance and why?

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22. Find the angular momentum of the electron revolving in second excited state orbit inhydrogen atom, $\left(h = 6.6 \times 10^{-34} Js\right)$.

23. Show that for a given incident ray, if the mirror is rotated by an $\angle\theta$, the reflected ray rotates by 2θ.

24. Can a 'total reflecting prism' be made of ice (R.I.1.3) for deviating a ray by $90°$? Give reason.

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25. Find the ratio of intensities at two points on a screen in young's double slit experiment when waves from the two slits have path difference of 0 and λ/4.

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26. Find the ratio of intensities at two points on a screen in young's double slit experiment when waves from the two slits have path difference of $\lambda/4$.

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27. Cesium shows photoelectric effect with visible light while zinc shows the effect with ultraviolet light. Does this mean that cesium will not show the effect with ultraviolet light and zinc with visible light. Explain.

28. How many quanta of different energy can beemitted by a Hydrogen atom if the electron is in the third orbit— justift.

29. Calculate the minimum wavelength of x-ray produced by on X-ray tube operating at 30KV $\left[h = 6.6 \times 10^{-34} Js \right]$.

30. Explain two characteristics features of nuclear force which distinguish it from the coulomb force.

31. Distinguish between extrinsic and intrinsic semi-conductors.

32. How will you use p-n-junction diode as full wave rectifier?

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33. Find the r.m.s. value of alternating current over a complete cycle.

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34. Derive and expression for electric field at a distance r from the centre of a short dipole along its axis and hence prove that the ratio of electric fields in axial position to equatorial position of dipole is is $2:1$.

35. Three point charges q, 2q and 3q are placed at the vertices of an equilateral triangle of side 'a'. Find the electric potential and

intensities at the geometric centre of the triangle.

36. Discuss the working Principle of Wheat stone bridge. Explain with diagram how will determine the resistance of a resistor which is unknown using this method.

37. Discuss the difference between ammeter and voltmeter. Draw a circuit diagram indicating how they may be used? How a galvanometer can be converted to an ammeter and voltmeter?

38. Two wires X and Y have same length of 44 cm and carry a current of 10A each. Wire X is bent into a circle and wire Y is bent into a

square. Obtain the magnitudes of the magnetic fields at their centres.

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39. Deduce an expression for mean value of current over a half cycle in an a.c circuit.

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40. A ray of monochromatic light enters a prism of angle 'A' at grazing incidence and

emerges at an angle θ to the normal on the opposite face. Show that refractive index μ of the material of the prism is given by

$$\mu = \left[1 + \left(\frac{\sin\theta + \cos A}{\sin A}\right)^2\right]^{\frac{1}{2}}.$$