PHYSICS

BOOKS - UNITED BOOK HOUSE

QUESTION PAPER 2016

Exercise

1. The speed of electromagnetic waves in vacuum is

A. $\sqrt{\in_0 \mu_0}$

B. $\frac{1}{\sqrt{\in_0}} \mu_0$

C. $\in_0 \mu_0$

D. $\frac{1}{\in_0} \mu_0$

Answer:

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2. For a monochromatic light incident on a metal surface, the maximum velocity of

emitted photoelectrons is v. Then the stopping potential would be

A. $2m\frac{v^2}{e}$

B. $m\frac{v^2}{e}$

C. $2m\frac{v^2}{2}e$

D. $\frac{mv^2}{\sqrt{2}e}$

Answer:

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3. A capacitor of capacitance C_1 is charged up to potential V and then connected in parallel to an uncharged capacitor of capcitance C_2 The final potential difference across each capacitor will be-

A. $\frac{C_2 v}{C_1 + C_2}$

B. $\frac{C_1 v}{C_1 + C_2}$

C. $\left(1 + \frac{C_2}{C_1}\right) V$

D. $\left(1 - \frac{C_2}{C_1}\right) V$

Answer:

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4. Which of the following phenomenon does not occur to both sound and light waves?

A. interfence

B. Diffraction

C. coherence

D. Polarisation

Answer:

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5. Two cells each of emf e but internal resistance r_1 and r_2 are connected in series through an external resistance R. IF the potential difference across the first cell is szero while current flow, the relation of R in terms of r_1 and r_2

A. R=$r_1 + r_2$

B. R=$r_1 - r_2$

C. R=$(r_1 + r_2)$

D. $R=\frac{1}{2}(r_1 - r_2)$

Answer:

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6. The ratio of minimum wavelength of Lyman and Balmer series in hydroden spectrum will be

A. 10

B. 5

C. 0.25

D. 1.25

Answer:

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7. If an electric dipole of moment $\vec{p}$ be placed along a uniform electric field of intessity $\vec{E}$, the torque acting on the dipole is

A. $\vec{T} = \vec{p} \times \vec{E}$

B. $\vec{T} = \vec{p} \times \vec{.} E$

C. $\vec{T} = \vec{p} \times \vec{+} E$

D. $\vec{T} = 0.$

Answer:

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8. In an astronomical telescope, focal length of the objective is made

A. half that of the eye-piece

B. equal to that of the ey piece

C. shorter than that of the ey-piece

D. greater than that of the ey-piece

Answer:

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9. A conducting circular loop of radius r carries a constant current I. It is placed in a ukniform magnetic field $\vec{B}$ such that $\vec{B}$ is

perpendicular to the place of the loop. The magnetic force acting on the loop is

A. Blr

B. 2piIB

C. Zero

D. piLB

Answer:

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10. A series LCR circuit acts as a purely resistive circuit, when

A. $\omega L > 1/\omega c$

B. $\omega L < 1/\omega c$

C. $\omega L = 1/\omega c$

D. none of these.

Answer:

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11. The relative magnetic permeability of a diamagnetic substance is

A. a. zero

B. b. slightly greater than 1

C. c. slightly less than 1

D. d. slightly less than zero.

Answer:

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12. what do you mean by magnetic flux density?

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13. What is the Q-factor?

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14. What is the decimal equivalent of the binary number 10011?

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15. Draw the symbol of a two input NOR gaste.

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16. What is the magnitude of force experienced by a stationary charge placed in a uniform electric field?

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17. In an electron is not deflected when passing through a certain region of space, can we be sure that there is no magnetic filed in that region?

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18. Write down lens maker's formula.

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19. What should be the value of the shunt to be connected in parallel to a galcanometer of resistance G, so that 1/n part of the main current will pass through the shunt?

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20. Equal number of identical cells are joined in series and again in parallel. Under what conditoin , will the currents in both the cases be the same ?

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21. In a compact coil of 50 turns, the current strength is 10A and the radius of the coil is 25×10^2 meter. Find the magnitude of the magnetic field at its centre.

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22. Mention two characteristics of electromagnetic waves.

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23. In a hydrogen atom, an electron of charge e revolves in an orbit of radius r with speed v. Find the magnitude of the resulting magnetic moment of the electron.

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24. The energy of an excited hydrogen atom is -1.51 eV. Determine the angular momentum of the electron according to Bogr's hypothesis.

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25. Why is satellite used for TV transmission to far places?

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26. What do you mean by demodulation? What is the importance of modulation index?

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27. What is an equipotential between the plates of a parallel plate capacitor.

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28. Two capacitors of capacitances 5 μF and 10 μF are charged to 16 volts and 10 volts respectively. Find the common potential when they are connected in parallel to each other.

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29. 64 identtical water drops coalesce to form a larger drop. If the nature and amount of charge be the same for all the drops, calculate the potential, capcitance and stored energy of the larger drop.

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30. With an accompaying diagram, write down Biot-Sawart's law in vector form. Can a 'cyclotron neutrons?

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31. Define magnetic permeability and magnetic susceptibility of a magnetic material. Determine the relation between magnetic permeability and magnetic susceptibility.

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32. Define critical angle. A luminous object is placed at a depth h in a medium of refractive index μ. Show that the radius r of the circular

base of the one through which light can emerge is $r = h / \sqrt{\mu^2 - 1}$

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33. If I_1 & I_2 be the sizes of real images for two positions of a convex lens between object and screen, then the size of the object is

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34. Define absolute refractive index.

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35. Write down Einstein's photoelectric equation and mention the symbols used.

The photoelectric threshold wavelength for a certain metal as 400mm. Find the maximum kinetic enrgy of the emitted electrons from the metal surface by ultraviolet light of wavelength 200nm. Given $h = 6.63 \times 10^{34}$

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36. State the postulates of Bohr's model of hydrogen atom .

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37. Wahat is a p-n junction diode? Draw the circuit diagram of a full wave rectifier using p-n junction diodes. Show the imput and output voltage waveforms by a schematic graph.

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38. What is AND gate? Draw the symbol of AND gate and perpare its truth table.

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39. What is a photodiode? Draw theI-V characteristic curve of a photodiode. Mention one use of photodiode.

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40. Establish Ohm's law from the concept of drift velocity of free elctrons.

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41. Define mobility of free electrons. A potential difference of 5 volts is applied across a conductor of length 10 cm Find the mobility of an electron if he drift velocity of an electron is2.5×10^{-2} cms.

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42. State Faraday's laws of electromgentic induction.

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43. The magnetic flux through a coil is varying according to the relation $\phi = \left(4t^2 + 2t - 5\right) Wb$, t measured in seconds. Calculate the induced current through the coil at t = 2s, if the resistance of the coil is 5Ω.

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44. Define the term'root mean square' (r.m.s) value of alternating current.

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45. AC voltage is applied on purely inductive circuit of inductance L. If the voltage be $e = E_0 \sin(\omega t)$ then show mathematically

current lags behind the voltage by a phase difference $\frac{\pi}{2}$

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46. If L is 100 mH and the applied a.c. source frequency be 50Hz, find the inductive reactance in the above case.

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47. State Huygen's principle for propagtion of light wave .

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48. The magnifying power of a telescope in normal adjustment is 20 , and the focal length of the eyepiece is 5×10^{-2} m. what is the magnifying power obtained when the system is adjusted so that the final image of a distant

object is formed 25×10^{-2} m away from the eyepiece?

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49. For a concave mirror, prove that $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$, where u, v and f have their usual meanings.

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