



PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

MCQS FROM BOARD EXAM

Wave Theory Of Light

1. A ray of light passes from vacuum into a medium of refractive index n . If the angle of

incidence is twice the angle of refraction, then
the angle of incidence is

A. $\cos^{-1}\left(\frac{\mu}{2}\right)$

B. $\cos^{-1}(\mu)$

C. $2 \cos^{-1}\left(\frac{\mu}{2}\right)$

D. $2 \sin^{-1}\left(\frac{\mu}{2}\right)$

Answer: C



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2. Light of a certain wavelength has a wave number $\bar{\nu}$ in vacuum. Its wave number in a medium of refractive index n is

A. $\frac{n}{\bar{\nu}}$

B. $\frac{1}{n\bar{\nu}}$

C. $\frac{\bar{\nu}}{n}$

D. $n\bar{\nu}$

Answer: D



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3. The critical angle for a medium is 60° . The refractive index of the medium is

A. $\frac{1}{\sqrt{3}}$

B. $\sqrt{\frac{3}{2}}$

C. 1

D. $\sqrt{3}$

Answer: D



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Interference And Diffraction

1. In the diffraction pattern due to a single slit of width 'd' with incident light of wavelength ' λ ', at an angle of diffraction ' θ ', the condition for first minimum is

A. $\lambda \sin \theta = d$

B. $d \cos \theta = \lambda$

C. $d \sin \theta = \lambda$

D. $\lambda \cos \theta = d$

Answer: C



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2. In diffraction pattern

- A. equal width with same intensity
- B. unequal width with varying intensity
- C. equal width with varying intensity
- D. equal width with varying intensity

Answer: B



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3. The diameter of the objective of a telescope is a , its magnifying power is m and wavelength of light is λ . The resolving power of the telescope is

A. $0.149 \times 10^{+7}$

B. $1.49 \times 10^{+7}$

C. $14.9 \times 10^{+7}$

D. $149 \times 10^{+7}$

Answer: A



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4. If numerical aperture of a microscope is increased, then its

- A. resolving power decreases
- B. limit of resolution decreases
- C. resolving power remains constant
- D. limit of resolution increases

Answer: B



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5. The limit of resolution of microscope, if the numerical aperture of microscope is 0.12, and the wavelength of light used is 600 nm, is

A. $0.25 \times 10^{-7} m$

B. $2.5 \times 10^{-7} m$

C. $25 \times 10^{-7} m$

D. $250 \times 10^{-7} m$

Answer: C



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6. In biprism experiment two interfering waves are produced due to division of

A. amplitude

B. wavefront

C. amplitude and wavefront

D. neither wavefront nor amplitude

Answer: B



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7. The resolving power of a telescope depends on

- A. length of the telescope
- B. focal length of an objective
- C. diameter of an objective
- D. focal length of an eyepiece

Answer: C



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Electrostatics

1. The electric intensity due to a uniformly charged infinite cylinder of radius R , at a distance $r(> R)$, from its axis is proportional to

A. $\frac{1}{r}$

B. $\frac{1}{r^2}$

C. $\frac{1}{r^3}$

D. r^3

Answer: A



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2. Two parallel plates separated by distance d are kept at potential difference V volt. A charge q of mass m enters in parallel plates with

some velocity. The acceleration of the charge particle will be

A. $\frac{qV}{dm}$

B. $\frac{dm}{qV}$

C. $\frac{qm}{dV}$

D. $\frac{dV}{qm}$

Answer: A



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3. Surface density of charge on a sphere of radius R in terms of electric intensity E at a distance in free space is

(ϵ_0 = permittivity of free space)

A. $\frac{\sigma}{\epsilon_0} \left[\frac{R}{r} \right]^2$

B. $\frac{\epsilon_0}{\sigma} \left[\frac{R}{r} \right]^2$

C. $\frac{R}{r} \left[\frac{\sigma}{\epsilon_0} \right]^2$

D. $\frac{R}{\sigma} \left[\frac{\sigma}{\epsilon_0} \right]^2$

Answer: A



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4. The electric flux over a sphere of radius $1m$ is ϕ . If radius of the sphere were doubled without changing the charge enclosed ,electric flux would become

A. double

B. half

C. same

D. zero

Answer: C



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5. The electric intensity of outside a charged sphere of radius R at a distance r ($r > R$) is

A. increase in charge on sphere.

B. increase in dielectric constant.

C. decrease in the distance from the centre of sphere.

D. decrease in square of distance from the centre of sphere.

Answer: D



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Current Electricity

1. Kirchhoff's first law of electricity follows.

A. conservation of energy

B. conservation of charge

C. conservation of electric potential

D. conservation of electric flux

Answer: B



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2. Sensitivity of potentiometer can be increased by

A. increasing resistance of wire

B. decreasing resistance of wire

C. increasing the length of wire

D. decreasing the length of wire

Answer: D



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3. Kirchhoff's second law is based on law of conservation of

A. charge and momentum

B. charge and energy

C. energy and charge

D. energy and momentum

Answer: C



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4. Interment which can measure terminal potential difference as well as electro motive force (e.m.f.) is

A. Wheatstone's meter bridge

B. Voltmeter

C. Potentiometer

D. Galvanometer

Answer: C



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5. In a potentiometer experiment the balancing length with a cell is 560 cm. When an external resistance of 10Ω is connected in

parallel to the cell, the balancing length changes by 60 cm. Find the internal resistance of the cell.

A. $l_1 = l_2 \left(\frac{R + r}{R} \right)$

B. $l_1 = l_2 \left(\frac{R}{R + r} \right)$

C. $l_1 = l_2 \left(\frac{R}{R - r} \right)$

D. $l_1 = l_2 \left(\frac{R - r}{R} \right)$

Answer: A



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Magnetic Effects Of Electric Current

1. If 'R' is the radius of dees and 'B' be the magnetic field of induction which positive charges (q) of mass (m) escapes from the cyclotron, then its maximum speed (V_{\max}) is

A. $\frac{qR}{Bm}$

B. $\frac{qm}{BR}$

C. $\frac{qBR}{m}$

D. $\frac{m}{qBR}$

Answer: C



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2. The resistance of an ideal voltmeter is

- A. low resistance
- B. high resistance
- C. infinite resistance
- D. zero resistance

Answer: C



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3. A solenoid of 1.5 metre length and 4.0 cm diameter possesses 10 turns per cm. A current of 5 ampere is flowing through it. The magnetic induction at axis inside the solenoid is

A. $\pi \times 10^{-5} T$

B. $2\pi \times 10^{-5} T$

C. $3\pi \times 10^{-5} T$

D. $4\pi \times 10^{-5} T$

Answer: B



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4. Which one of the following particles cannot be accelerated by a cyclotron ?

A. Electrons

B. Protons

C. Deuterons

D. α – particles

Answer: A



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Electromagnetic Induction

1. An inductive coil has resistance of 100Ω . When an ac signal of frequency $1000Hz$ is fed to the coil. The applied voltage leads the current by 45° . What is the inductance of the coil?

A. $0.25H$

B. $0.5H$

C. $4H$

D. $314H$

Answer: A



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2. The primary coil of an ideal stepup transformer has 100 turns and the transformer ratio is also 100. The input

voltage and power are 220 V and 1100 W.

Calculate (i) number of turns in secondary (ii)

current in primary (iii) voltage across

secondary (iv) current in secondary (v) power

in secondary.

A. 600

B. 500

C. 400

D. 300

Answer: D



Electrons And Photons

1. Let p and E denote the linear momentum and energy of a photon. If the wavelength is decreased,

- A. both p and E increase
- B. p increases and E decreases
- C. p decreases and E increases
- D. both p and E decrease

Answer: D



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2. In photoelectric effect, the number of photoelectrons emitted is proportional to :

- A. varies inversely with frequency
- B. varies directly with frequency
- C. varies inversely with intensity
- D. varies idirectly with intensity

Answer: D



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3. When radiations of wavelength λ_1 and λ_2 are incident on certain photosensitive material, the energies of electron ejected are E_1 and E_2 respectively, such that $E_1 > E_2$, Then Planck's constant 'h' is (C = velocity of light)

A.
$$\frac{(E_1 - E_2)(\lambda_1 - \lambda_2)}{C(\lambda_1 \cdot \lambda_2)}$$

- B. $\frac{(E_1 - E_2)\lambda_1 C}{(\lambda_1 - \lambda_2)\lambda_2}$
- C. $\frac{(E_1 - E_2)\lambda_1 \lambda_2}{C(\lambda_2 - \lambda_1)}$
- D. $\frac{(\lambda_2 - \lambda_1)C}{(E_1 - E_2)\lambda_1 \cdot \lambda_2}$

Answer: C



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4. When monochromatic light falls on a photosensitive material, the number of photoelectrons emitted per second is n and their maximum kinetic energy is K_{\max} . If the

intensity of the incident light is doubled
keeping the frequency same, then:

- A. same as its initial value
- B. two times its initial value
- C. more than two times its initial value
- D. less than two times its initial value

Answer: C



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5. The energy of a photon of wavelength λ is given by

A. $hc\lambda$

B. $\frac{h\lambda}{c}$

C. $\frac{\lambda}{hc}$

D. $\frac{hc}{\lambda}$

Answer: D



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1. Nuclide having the same number of protons and also neutrons but differ in radioactivity are called as

A. isobars

B. α – particle

C. istopse

D. γ – particles

Answer: C



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2. Find the wavelength of the emitted radiation, if electron in hydrogen atom jumps from third orbit to second orbit.

A. $\frac{27}{32} \lambda$

B. $\frac{32}{27} \lambda$

C. $\frac{2}{3} \lambda$

D. $\frac{3}{2} \lambda$

Answer: A



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3. Linear momentum of an electron in Bohr orbit of H-atom (principal quantum number n) is proportional to

A. n

B. $\frac{1}{n}$

C. $\frac{1}{n^2}$

D. n^2

Answer: B



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4. The de-Broglie wavelength of the tennis ball of mass 60g moving with a velocity of 10 m/s is approx.: (Plank's constant

$$h = 6.63 \times 10^{-34} \text{ Js})$$

A. $1.326 \times 10^{-28} \text{ kg} - \text{ m/s}$

B. $7.54 \times 10^{-28} \text{ kg} - \text{ m/s}$

C. $1.326 \times 10^{-27} \text{ kg} - \text{ m/s}$

D. $7.54 \times 10^{-27} \text{ kg} - \text{ m/s}$

Answer: C



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Semiconductors

1. In an oscillator, for sustained oscillations, Barkhausen criterion is $A\beta$ equal to (A = voltage gain without feedback and β = feedback factor)

A. zero

B. less than 1

C. one

D. infinity

Answer: C



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2. The width of depletion regio of p-n junction diode is

A. 0.5 nm to 1 nm

B. 5 nm to 10 nm

C. 50 nm to 500 nm

D. 500 nm to 1000 nm

Answer: D



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3. A hole in a semiconductor is

A. extra electron in valence band

B. extra electron in conduction band

C. missing electron in valence band

D. missing electron in conduction band

Answer: D



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4. Colour of light emitted by LED depends upon

A. its forward bias

B. its reverse bias

C. the band gap of the material of
semiconductor

D. its size

Answer: C



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5. In a semiconductor , acceptor impurity is

A. antimony

B. indium

C. phosphorous

D. arsenic

Answer: B



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6. The output of a two input NOR gate is in state 1 when :-

A. all input are high

B. all inputs are low

C. only one of its inputs is high

D. only one of its inputs is low

Answer: B



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7. A Truth table is given below. The below. The logic gate having following truth table is.

<i>A</i>	<i>B</i>	<i>Y</i>
0	0	1
1	0	0
0	1	0
1	1	0

A. AND

B. NOR

C. OR

D. NAND

Answer: B



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Communication Systems

1. The process of regaining of information from carrier wave at the receiver is termed as

A. modulation

B. transmission

C. propagation

D. demodulation

Answer: D



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2. A device that converts one form of energy into another form is termed as

A. transducer

B. transmitter

C. amplifier

D. receiver

Answer: A



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3. The upper atmosphere layer is known as

A. stratosphere

B. mesosphere

C. troposphere

D. inonosphere

Answer: D



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4. Line of sight (LOS) communication is also known as

A. sky wave

B. ground wave

C. sound wave

D. space wave

Answer: D



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5. The power radiated by linear antenna of length 'l' is proportional to (λ =wavelength)

A. $\frac{\lambda}{l}$

B. $\left(\frac{\lambda}{l}\right)^2$

C. $\frac{l}{\lambda}$

D. $\left(\frac{l}{\lambda}\right)^2$

Answer: D



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6. Ionosphere is mainly composed of

A. positive ions and electrons

B. water vapour and smoke

C. ozone layer

D. dust particles

Answer: A



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7. In communication system, the process of superimposing a low frequency signal on a high frequency wave is known as

A. detection

B. mixing

C. modulation

D. attenuation

Answer: C



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