NEET 2026 Re-exam — Physics Question Paper with Solutions

25 Physics questions as set in the paper · answers checked by RankUp

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1. A photon and an electron, each of 20 eV energy, move in free space. The ratio of linear momentum of electron (p_e) to that of photon (p_{Ph}), p_e/p_{Ph}, is:
[Take speed of light = 3×10^8 m s^{-1}, charge of electron = -1.6×10^{-19} C and mass of electron = 9×10^{-31} kg]

(A) 275
(B) 2/450
(C) 1/250
(D) 225

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2. Consider a long solenoid of length l and radius r. If n is the number of turns per unit length and μ_0 is the permeability of free space, the inductance of the solenoid is :

(A) $2\mu_0\pi n^2r^2l$
(B) $\mu_0\pi n^2r^2l$
(C) $\mu_0 n^2r^2l$
(D) $(\mu_0/2\pi)n^2r^2l$

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3. The temperature of a metallic sphere of radius R is increased by a small amount ΔT. If the linear coefficient of thermal expansion of the metal is α, the approximate increase in the volume of the sphere is:

(A) $6\pi R^3\alpha\Delta T$
(B) $2\pi R^3\alpha\Delta T$
(C) $3\pi R^3\alpha\Delta T$
(D) $4\pi R^3\alpha\Delta T$

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4. Two planets P_1 and P_2 with equal mass have radii R_1 and R_2, respectively, where $R_2 = R_1/2$. The escape speeds of P_1 and P_2 are v_1 and v_2, respectively. Then v_2/v_1 is:

(A) 2
(B) $1/\sqrt{2}$
(C) 1
(D) $\sqrt{2}$

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5. An ac voltage $V = 220 \sin(2 \times 10^3 t)$ Volt is applied to a series LCR circuit. Then the current amplitude in this circuit is:
(Given : L = 10 mH, C = 25 μF, R = 100 Ω)

(A) 22.0 A
(B) 2.2 A
(C) 5.5 A
(D) 11.0 A

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6. In an adiabatic expansion, the temperature of one mole of an ideal monatomic gas ($\gamma = 5/3$) decreases from 60 K to 50 K . The work done by the gas in the process is:
(Take the universal gas constant as R = 8.3 J mol^{-1} K^{-1})

(A) 166 J
(B) 41.5 J
(C) 83 J
(D) 124.5 J

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7. Consider a particle moving along a straight line, whose position as a function of time is given by $s(t) = \alpha t^2 - \beta t + \gamma$, where $\alpha = 1$ m s^{-2}, $\beta = 6$ m s^{-1} and $\gamma = 5$ m. The average speed of the particle, in m s^{-1} from t = 0 to t = 6 s is:

(A) 0
(B) 12
(C) 6
(D) 3

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8. The following table presents the part of the electromagnetic spectrum and their corresponding major applications.
Part of the electromagnetic spectrum: P. Microwave Q. UV rays R. Gamma rays S. Radio wave
Applications: I. For purifying the water II. For warming the food III. For AM and FM communication systems IV. For treating the Cancer cells
The correct option is:

(A) P-II, Q-IV, R-III, S-I
(B) P-I, Q-II, R-III, S-IV
(C) P-I, Q-IV, R-II, S-III
(D) P-II, Q-I, R-IV, S-III

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9. An ideal gas is made of polyatomic molecules. Each of the molecules has three translational, three rotational and f number of vibrational modes. If the ratio of heat capacities C_P/C_V of the gas is 8/7, then the value of f is:

(A) 1
(B) 4
(C) 3
(D) 2

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10. An electromagnetic wave travelling in a lossless dielectric medium having a dielectric constant, $\varepsilon_r = 9$, has the electric field, $E_x = E_0 \sin(kz - 2\pi \times 10^6 t)$ V m^{-1} where E_0 is the amplitude and k is the wave vector. Among the following options, the incorrect choice is

(A) The direction of propagation of the electromagnetic wave is along +z
(B) The speed of the electromagnetic wave inside the medium is 10^8 m s^{-1}
(C) The wavelength of the electromagnetic wave inside the medium is 300 m
(D) The magnetic field is given by the relation B_y = (E_0/v) sin(kz − 2π × 10^6 t) where v is the speed of the electromagnetic wave inside the medium

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11. A particle of mass M moves along a horizontal x axis from x = 0 to x = L. The coefficient of kinetic friction varies as a function of x as $\mu_k(x) = \mu_0 - \alpha x$, where μ_0, α are constants of appropriate dimensions, so that $\mu_k(L) = 0$. The total work done by the frictional force during the motion is $n\mu_0 MgL$, where g is the acceleration due to gravity. The value of n is:

(A) 1/2
(B) 3
(C) 1
(D) 1/3

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12. Consider a fixed uniformly charged insulating sphere with radius R and total charge +Q. A point charge −q (q ≪ Q) with mass m is released from rest at a distance of 3R from the centre of the charged sphere. When the point charge reaches the surface of the sphere, its speed is:
(ε_0 is the permittivity of vacuum, neglect gravitational forces).

(A) $\sqrt{(Qq/(4\pi\varepsilon_0 mR))}$
(B) $\sqrt{(3Qq/(4\pi\varepsilon_0 mR))}$
(C) $\sqrt{(2Qq/(3\pi\varepsilon_0 mR))}$
(D) $\sqrt{(Qq/(3\pi\varepsilon_0 mR))}$

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13. A car travels on a circular racetrack of radius 50 m , which is banked at an angle θ. If the car travels at a speed 10 m s^{-1}, then the wear and tear on its tyres is minimum. Taking the acceleration due to gravity to be 10 m s^{-2}, the value of θ is:

(A) $\tan^{-1}(2\sqrt{3})$
(B) $\tan^{-1}(1/5)$
(C) $\tan^{-1}(2/5)$
(D) $\tan^{-1}(\sqrt{3}/2)$

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14. A solid sphere A of radius R and mass M is attached at a point to a smaller solid sphere B of radius r < R and mass m < M. Assume that the line joining their centres lies along the horizontal. The moment of inertia of the system calculated about a vertical axis passing through the centre of A is I_A and that about a vertical axis passing through the centre of B is I_B. The difference $I_A - I_B$ is:

(A) 0
(B) $(M - m)(R + r)^2$
(C) $(m - M)(R + r)^2$
(D) $(m - M)(R - r)^2$

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15. Consider that an electron is revolving in an excited state of Hydrogen atom with velocity $\sqrt{25.6} \times 10^5$ m s^{-1}. The radius of the orbit is $x \times 10^{-9}$ m. The value of x is:
[Take the mass of electron to be 9×10^{-31} kg, charge of electron = -1.6×10^{-19} C and $1/(4\pi\varepsilon_0) = 9 \times 10^9$ N m^2 C^{-2}]

(A) 1
(B) 4
(C) 3
(D) 2

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16. The mean free path of molecules in an ideal gas A is half that of another ideal gas B. The diameter of the spherical molecules of gas A is twice the diameter of the molecules of B. If number densities of the gases A and B are n_A and n_B, respectively, the correct option is:

(A) $n_A = n_B/2$
(B) $n_A = n_B$
(C) $n_A = 2n_B$
(D) $n_A = n_B/4$

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17. A cylindrical cork of uniform density floats in a liquid of density ρ_1. If the cork is depressed slightly and released, it oscillates harmonically with time period T. If the same cork floats in another liquid of density ρ_2, then the similar oscillation has time period 2T. The value of ρ_2/ρ_1 is:

(A) 1/4
(B) 4
(C) 2
(D) 1/2

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18. For sound waves, if the number of nodes for the 5^{th} harmonic of an open-ended pipe is n and that for the 9^{th} harmonic of the same pipe with one of its ends closed is m, the ratio n/m is

(A) 3/5
(B) 5/9
(C) 9/5
(D) 1

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19. Consider the following nuclear reaction

$^{238}U \rightarrow {}^{234}Th + {}^{4}He$

Take masses of ^{238}U, ^{234}Th and ^{4}He as 238.050 u, 234.043 u and 4.003 u , respectively. The Q value for the reaction, in keV, is:

[Given: 1 u = 931.5 MeV c^{-2}]

(A) 3740
(B) 3726
(C) 3730
(D) 3736

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20. Which of the following measurements require 'index correction'?

(A) Measurement of speed of sound using resonance tube
(B) Measurement of resistance of a wire using meter bridge
(C) Measurement of gravitational acceleration using simple pendulum
(D) Measurement of focal length of lenses using optical bench

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21. In a solar system, the time-period of revolution of a planet tracing a circular orbit of radius R is proportional to:

(A) R^3
(B) R^(1/2)
(C) R^(3/2)
(D) R^2

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22. Consider that σ_s, k_B, b represents Stefan-Boltzmann constant, Boltzmann constant and Wien's displacement law constant, respectively. The dimension of σ_s k_B^{-1} b is

(A) $[L^{-1} T^{-1} K^{-4}]$
(B) $[L^{-1} T^{-1} K^{-2}]$
(C) $[L^{-1} K^{-2}]$
(D) $[L^{-1} T^{-1} K^{-3}]$

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23. A ray of light with wavelength λ is incident on three different photoelectric cells namely 1,2 and 3 . The threshold wavelength of these photoelectric cells are λ_1, λ_2, and λ_3, respectively and the magnitude of stopping potentials of these cells are V_1, V_2 and V_3, respectively. The relation between λ and threshold wavelengths are $\lambda_1 < \lambda$, $\lambda_2 > \lambda$ and $\lambda_3 \gg \lambda$. The correct option is:

(A) $V_1 < V_2$, $V_3 = 0$
(B) $V_1 = 0$, $V_2 < V_3$
(C) $V_1 = 0$, $V_2 > V_3$
(D) $V_1 > V_2$, $V_3 = 0$

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24. Two infinitely long parallel conducting wires A and B carry currents I and 2I, respectively, in the same direction. The wire A has uniform mass per unit length λ and lies on an insulated floor. The wire B is kept fixed at a height h above the floor. The minimum magnitude of h so that the wire A does not rise from the floor is: [g is the acceleration due to gravity and μ_0 is the permeability of free space.]

(A) $4\mu_0 I^2/(\pi\lambda g)$
(B) $\mu_0 I^2/(2\pi\lambda g)$
(C) $\mu_0 I^2/(\pi\lambda g)$
(D) $2\mu_0 I^2/(\pi\lambda g)$

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25. Consider a spring-mass simple harmonic oscillator in one dimension. The mass of the particle is m kg and the spring constant is k N m^{-1}. At a given instant, the extension of the spring is x meter and the speed of the particle is v m s^{-1}. On the x − v plane, if the graph of v as a function of x is a circle, then the correct option is:

(A) $k = \sqrt{m}$
(B) $k = 1/m$
(C) $k = m$
(D) $k = m^2$

Answer key and explanations

1. Answer: (D) 225

E = 20 eV = 3.2×10^{-18} J. Photon: $p = E/c = 3.2 \times 10^{-18} / 3 \times 10^8 \approx 1.07 \times 10^{-26}$ kg m s^{-1}. Electron: $p = \sqrt{(2mE)} = \sqrt{(2 \times 9 \times 10^{-31} \times 3.2 \times 10^{-18})} = 2.4 \times 10^{-24}$ kg m s^{-1}. Ratio = $2.4 \times 10^{-24} / 1.067 \times 10^{-26} = 225$; the fractional values invert the ratio.

2. Answer: (B) $\mu_0\pi n^2 r^2 l$

Inside the solenoid $B = \mu_0 nI$; flux linkage = $(nl)(\mu_0 nI)(\pi r^2)$, so $L = \mu_0 n^2 \pi r^2 l = \mu_0 n^2 Al$. Dropping π (the area πr^2) or adding a factor 2 gives the incorrect expressions.

3. Answer: (D) $4\pi R^3 \alpha \Delta T$

The volume coefficient is $\gamma = 3\alpha$, so $\Delta V = 3\alpha \times (4/3)\pi R^3 \times \Delta T = 4\pi R^3 \alpha \Delta T$. Forgetting the factor 3 (using α as the volume coefficient) would give $(4/3)\pi R^3 \alpha \Delta T$, which is not offered.

4. Answer: (D) √2

$v_{esc} = \sqrt{(2GM/R)}$; with equal masses $v \propto 1/\sqrt{R}$, so $v_2/v_1 = \sqrt{(R_1/R_2)} = \sqrt{2}$. Inverting the ratio gives $1/\sqrt{2}$, and forgetting the square root gives 2.

5. Answer: (B) 2.2 A

ω = 2000 rad s^{-1}: $X_L = \omega L = 2000 \times 0.010 = 20\ \Omega$ and $X_C = 1/(\omega C) = 1/(2000 \times 25 \times 10^{-6}) = 20\ \Omega$. They cancel (resonance), so $Z = R = 100\ \Omega$ and $I_0 = 220/100 = 2.2$ A. Ignoring R or the reactances does not give this value.

6. Answer: (D) 124.5 J

For an adiabatic process $W = nR(T_1 - T_2)/(\gamma - 1) = 1 \times 8.3 \times 10 / (2/3) = 124.5$ J, which equals the fall in internal energy $(3/2)R\Delta T$. Using $nR\Delta T$ alone gives 83 J.

7. Answer: (D) 3

$s = t^2 - 6t + 5$ and $v = 2t - 6$, which reverses at $t = 3$ s. $s(0) = 5$ m, $s(3) = -4$ m, $s(6) = 5$ m, so the distance covered is $9 + 9 = 18$ m and the average speed is $18/6 = 3$ m s^{-1}. The net displacement is zero, which gives the average velocity, not the speed.

8. Answer: (D) P-II, Q-I, R-IV, S-III

Microwaves heat food (microwave ovens), UV rays kill germs and are used in water purifiers, gamma rays are used in radiotherapy to destroy cancer cells, and radio waves carry AM and FM broadcasts.

9. Answer: (B) 4

Each translational and rotational mode contributes $\frac{1}{2}R$ and each vibrational mode contributes R (kinetic + potential) to C_V: $C_V = (3 + f)R$ and $C_P = (4 + f)R$. Setting $(4 + f)/(3 + f) = 8/7$ gives $28 + 7f = 24 + 8f$, so $f = 4$. Counting each vibration as only $\frac{1}{2}R$ would lead to $f = 8$, which is not offered.

10. Answer: (C) The wavelength of the electromagnetic wave inside the medium is 300 m

$v = c/\sqrt{\varepsilon_r} = 3 \times 10^8/3 = 10^8$ m s^{-1}, and the phase $(kz - \omega t)$ means travel along $+z$, so those statements are correct. With $f = 10^6$ Hz, $\lambda = v/f = 100$ m, not 300 m (300 m is the vacuum wavelength). B is along y with amplitude E_0/v, since $E \times B$ must point along $+z$, so that statement is also correct.

11. Answer: (A) 1/2

$\mu_k(L) = 0$ gives $\alpha = \mu_0/L$. Work by friction $= -\int_0^L (\mu_0 - \alpha x)Mg\, dx = -Mg(\mu_0 L - \alpha L^2/2) = -\mu_0 MgL/2$, i.e. magnitude $\frac{1}{2}\mu_0 MgL$. Using the initial coefficient μ_0 throughout would give $n = 1$.

12. Answer: (D) $\sqrt{(Qq/(3\pi\varepsilon_0 mR))}$

Loss of potential energy $= (Qq/4\pi\varepsilon_0)(1/R - 1/3R) = (Qq/4\pi\varepsilon_0)(2/3R) = \frac{1}{2}mv^2$. So $v^2 = 4Qq/(3 \times 4\pi\varepsilon_0 mR) = Qq/(3\pi\varepsilon_0 mR)$. Using $1/R$ alone (as if starting from infinity) gives $\sqrt{(Qq/(2\pi\varepsilon_0 mR))}$, not offered, while dropping the factor 2 from $\frac{1}{2}mv^2$ gives the $4\pi\varepsilon_0$ form.

13. Answer: (B) $\tan^{-1}(1/5)$

Tyre wear is least when no friction is needed, i.e. at the optimum banking speed, for which $\tan\theta = v^2/(rg) = 100/(50 \times 10) = 1/5$. Using rg/v^2 inverts the ratio.

14. Answer: (C) $(m - M)(R + r)^2$

The centres are $R + r$ apart. $I_A = (2/5)MR^2 + (2/5)mr^2 + m(R + r)^2$ and $I_B = (2/5)MR^2 + M(R + r)^2 + (2/5)mr^2$, so $I_A - I_B = (m - M)(R + r)^2$, which is negative since $m < M$. The $(M - m)$ form has the sign reversed.

15. Answer: (A) 1

The Coulomb force supplies the centripetal force: $mv^2/r = ke^2/r^2$, so $r = ke^2/(mv^2)$. Here $v^2 = 25.6 \times 10^{10} = 2.56 \times 10^{11}$ m^2 s^{-2}, $ke^2 = 9 \times 10^9 \times 2.56 \times 10^{-38} = 2.304 \times 10^{-28}$ and $mv^2 = 9 \times 10^{-31} \times 2.56 \times 10^{11} = 2.304 \times 10^{-19}$, giving $r = 1.0 \times 10^{-9}$ m, so $x = 1$.

16. Answer: (A) $n_A = n_B/2$

$\lambda = 1/(\sqrt{2}\,\pi\, d^2\, n)$, so $\lambda_A/\lambda_B = (d_B^2\, n_B)/(d_A^2\, n_A) = n_B/(4n_A)$. Setting this equal to $1/2$ gives $n_A = n_B/2$. Ignoring the d^2 dependence would wrongly give $n_A = 2n_B$.

17. Answer: (A) 1/4

For a floating cylinder of cross-section A, the restoring force per unit depression is ρAg, so $T = 2\pi\sqrt{(m/(\rho Ag))} \propto 1/\sqrt{\rho}$. Doubling T requires $\rho_2 = \rho_1/4$. Taking $T \propto \sqrt{\rho}$ would give 4.

18. Answer: (D) 1

In an open pipe the p^{th} harmonic has antinodes at both ends and p displacement nodes, so $n = 5$. In a closed pipe the $(2k - 1)^{th}$ harmonic has k nodes (including the closed end); the 9^{th} harmonic has $k = 5$, so $m = 5$. Hence $n/m = 1$; taking the ratio of harmonic numbers gives 5/9.

19. Answer: (B) 3726

Mass defect $\Delta m = 238.050 - (234.043 + 4.003) = 0.004$ u. $Q = 0.004 \times 931.5$ MeV $= 3.726$ MeV $= 3726$ keV. Rounding 931.5 to 935 or 932 gives the nearby distractors.

20. Answer: (D) Measurement of focal length of lenses using optical bench

Index correction is applied on an optical bench, where the distance read between the index marks on the uprights differs from the actual distance between the lens and the needle; it is found with a rod of known length. The resonance tube needs an end correction and the metre bridge an end correction, not an index correction.

21. Answer: (C) R^(3/2)

For a circular orbit $GMm/R^2 = m(2\pi/T)^2 R$, so $T^2 = 4\pi^2 R^3/(GM)$ and $T \propto R^{(3/2)}$ (Kepler's third law). R^3 is proportional to T^2, not T.

22. Answer: (B) $[L^{-1} T^{-1} K^{-2}]$

σ (W $m^{-2} K^{-4}$) = [M $T^{-3} K^{-4}$]; k_B (J K^{-1}) = [M $L^2 T^{-2} K^{-1}$]; b (m K) = [L K]. $\sigma k_B^{-1} b$ = [M $T^{-3} K^{-4}$][$M^{-1} L^{-2} T^2$ K][L K] = [$L^{-1} T^{-1} K^{-2}$]. Forgetting the K in Wien's constant would leave K^{-3}.

23. Answer: (B) $V_1 = 0, V_2 < V_3$

Emission occurs only if λ is shorter than the threshold wavelength. For cell 1 ($\lambda_1 < \lambda$) there is no emission, so $V_1 = 0$. $eV = hc/\lambda - hc/\lambda_0$ grows as the threshold λ_0 increases, so V_3 ($\lambda_3 \gg \lambda$) exceeds V_2. Treating a larger threshold wavelength as a larger work function reverses this.

24. Answer: (C) $\mu_0 I^2/(\pi\lambda g)$

Parallel currents attract, so B pulls A upward with force per unit length $\mu_0(I)(2I)/(2\pi h) = \mu_0 I^2/(\pi h)$. A stays on the floor if this does not exceed its weight per unit length λg, i.e. $h \geq \mu_0 I^2/(\pi\lambda g)$. Forgetting the factor 2 in the current 2I gives $\mu_0 I^2/(2\pi\lambda g)$.

25. Answer: (C) k = m

Energy conservation gives $\frac{1}{2}kx^2 + \frac{1}{2}mv^2 = E$, an ellipse in the x–v plane: $x^2/(2E/k) + v^2/(2E/m) = 1$. It becomes a circle only when the two semi-axes are equal, i.e. k = m numerically ($\omega = 1$ rad s^{-1}).

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