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Physics Formula Sheet for NEET & JEE Main 2026

A high-yield formula map across the shared mechanics, thermal physics, waves, electricity, magnetism, optics and modern-physics syllabus areas.

11	150+	SI	2
Formula sections	Recall lines	Default units	Official syllabi

Use-condition note: formulas are compact recall triggers. Check assumptions, sign convention, units and the exact problem model before substitution. Experimental-skills preparation requires separate practical revision.

How to use this PDF

Use active recall: hide the answer column, attempt the question or formula from memory, then mark the exact reason for an error. Recheck the linked official source when an examination authority changes its syllabus or instructions.

Official JEE Main 2026 syllabus:
https://cdnbbsr.s3waas.gov.in/s3f8e59f4b2fe7c5705bf878bbd494ccdf/uploads/2025/10/202510311323551056.pdf

Prepared and last checked: 19 July 2026. Free download from sarkariresultpdf.com.

1. Measurement, vectors and kinematics

Quantity / result	Formula or condition
Percentage error	(absolute error / measured value) * 100
Result error: $z = x \pm y$	$\Delta z = \Delta x + \Delta y$
Result error: $z = x^a y^b$	$\Delta z / z = \lvert a \rvert \Delta x/x + \lvert b \rvert \Delta y/y$
Vector magnitude	$\lvert A \rvert = \sqrt{A_x^2 + A_y^2 + A_z^2}$
Dot product	$A \cdot B = AB \cos(\theta)$
Cross-product magnitude	$\lvert A \times B \rvert = AB \sin(\theta)$
Constant acceleration	$v = u + at$
Displacement	$s = ut + (1/2)at^2$
No-time relation	$v^2 = u^2 + 2as$
Average velocity at constant a	$v_{avg} = (u + v)/2$
Projectile time	$T = 2u \sin(\theta)/g$
Projectile maximum height	$H = u^2 \sin^2(\theta)/(2g)$
Projectile range	$R = u^2 \sin(2\theta)/g$
Uniform circular acceleration	$a_c = v^2/r = \omega^2 r$

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

2. Laws of motion, work and collisions

Quantity / result	Formula or condition
Newton's second law	F = dp/dt; for constant mass F = ma
Impulse	J = integral F dt = Delta p
Static friction	f_s <= mu_s N
Kinetic friction	f_k = mu_k N
Level circular road	f supplies mv^2/r
Ideal banked road	tan(theta) = v^2/(rg)
Work by constant force	W = Fs cos(theta)
Variable-force work	W = integral F.dx
Kinetic energy	K = (1/2)mv^2
Work-energy theorem	W_net = Delta K
Power	P = dW/dt = F.v
Spring energy	U = (1/2)kx^2
Momentum conservation	sum p_initial = sum p_final
Coefficient of restitution	e = relative separation speed / relative approach speed

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

3. Centre of mass and rotational motion

Quantity / result	Formula or condition
Centre of mass	R_cm = sum(m_i r_i) / sum(m_i)
Torque	tau = r x F; |tau| = rF sin(theta)
Angular momentum	L = r x p; fixed axis L = I omega
Rotational dynamics	tau_net = I alpha
Rotational kinetic energy	K_rot = (1/2)I omega^2
Rolling condition	v_cm = omega R
Parallel-axis theorem	I = I_cm + Md^2
Perpendicular-axis theorem	I_z = I_x + I_y for a planar body
Ring about centre	I = MR^2
Disc about centre	I = (1/2)MR^2
Solid sphere about diameter	I = (2/5)MR^2
Spherical shell about diameter	I = (2/3)MR^2
Rod about centre	I = (1/12)ML^2
Rod about end	I = (1/3)ML^2

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

4. Gravitation, solids and fluids

Quantity / result	Formula or condition
Gravitational force	F = GMm/r^2
Field / acceleration	g = GM/r^2
Potential	V = -GM/r
Potential energy	U = -GMm/r
Orbital speed	v_o = sqrt(GM/r)
Escape speed from radius R	v_e = sqrt(2GM/R) = sqrt(2gR)
Satellite period	T = 2pi sqrt(r^3/GM)
Satellite total energy	E = -GMm/(2r)
Young's modulus	Y = (F/A)/(Delta L/L)
Fluid pressure	p = p0 + rho gh
Continuity	A1 v1 = A2 v2
Bernoulli	p + (1/2)rho v^2 + rho gh = constant
Stokes drag	F = 6pi eta r v
Terminal speed of sphere	v_t = 2r^2(rho_s-rho_f)g/(9eta)
Capillary rise	h = 2S cos(theta)/(rho g r)
Excess pressure	drop: 2S/r; soap bubble: 4S/r

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

5. Thermal physics and kinetic theory

Quantity / result	Formula or condition
Linear expansion	Delta L = alpha L Delta T
Heat capacity	Q = mc Delta T
Latent heat	Q = mL
Conduction rate	Q/t = kA Delta T/L
Stefan radiation	P = e sigma A(T^4 - T0^4)
Ideal gas	PV = nRT = Nk_B T
First law	Delta Q = Delta U + Delta W (work done by system)
Isothermal ideal gas	PV = constant; Delta U = 0
Adiabatic ideal gas	PV^gamma = constant
Adiabatic temperature form	TV^(gamma-1) = constant
Carnot efficiency	eta = 1 - T_c/T_h
Kinetic-theory pressure	P = (1/3)rho c_rms^2
RMS molecular speed	c_rms = sqrt(3RT/M)
Equipartition internal energy	U = (f/2)nRT

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

6. Oscillations and waves

Quantity / result	Formula or condition
SHM displacement	x = A sin(omega t + phi)
SHM velocity	v = +/- omega sqrt(A^2 - x^2)
SHM acceleration	a = -omega^2 x
Spring period	T = 2pi sqrt(m/k)
Simple pendulum	T = 2pi sqrt(L/g) for small angle
SHM total energy	E = (1/2)kA^2
Wave speed	v = f lambda = omega/k
String wave speed	v = sqrt(tension/mu)
Open pipe frequencies	f_n = nv/(2L), n = 1,2,3,...
Closed pipe frequencies	f_n = (2n-1)v/(4L), n = 1,2,3,...
Beat frequency	f_b = |f1 - f2|
Doppler template	f' = f (v +/- v_observer)/(v -/+ v_source)

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

7. Electrostatics and capacitance

Quantity / result	Formula or condition
Coulomb force	F = (1/(4pi eps0)) q1q2/r^2
Point-charge field	E = (1/(4pi eps0)) q/r^2
Point-charge potential	V = (1/(4pi eps0)) q/r
Two-charge potential energy	U = (1/(4pi eps0)) q1q2/r
Electric dipole moment	p = qd (from negative to positive)
Dipole torque	tau = pE sin(theta)
Dipole energy	U = -pE cos(theta)
Gauss law	integral E.dA = q_enclosed/eps0
Capacitance	C = Q/V
Parallel plate capacitor	C = eps A/d
Capacitors in parallel	C_eq = sum C_i
Capacitors in series	1/C_eq = sum(1/C_i)
Capacitor energy	U = (1/2)CV^2 = Q^2/(2C) = QV/2
Energy density	u = (1/2)eps E^2

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

8. Current electricity and magnetism

Quantity / result	Formula or condition
Electric current	I = dQ/dt = neA v_d
Ohm law	V = IR
Resistance	R = rho L/A
Electric power	P = VI = I^2R = V^2/R
Resistors in series	R_eq = sum R_i
Resistors in parallel	1/R_eq = sum(1/R_i)
Terminal voltage of cell	V = E - Ir while discharging
Magnetic force on charge	F = qvB sin(theta)
Circular radius in B	r = mv/(|q|B)
Force on conductor	F = BIL sin(theta)
Long straight wire	B = mu0 I/(2pi r)
Circular coil centre	B = mu0 NI/(2R)
Long solenoid	B = mu0 nI
Current-loop torque	tau = NIAB sin(theta)
Cyclotron frequency	f = |q|B/(2pi m)

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

9. EMI, alternating current and electromagnetic waves

Quantity / result	Formula or condition
Magnetic flux	Phi_B = BA cos(theta)
Faraday-Lenz law	emf = -N dPhi_B/dt
Motional emf	emf = Blv for perpendicular motion
Inductor emf	emf = -L dI/dt
Inductor energy	U = (1/2)LI^2
AC RMS values	V_rms = V0/sqrt(2); I_rms = I0/sqrt(2)
Inductive reactance	X_L = omega L
Capacitive reactance	X_C = 1/(omega C)
Series LCR impedance	Z = sqrt(R^2 + (X_L-X_C)^2)
Resonance	omega0 = 1/sqrt(LC)
Average AC power	P = V_rms I_rms cos(phi)
Ideal transformer	V_s/V_p = N_s/N_p = I_p/I_s
EM-wave relation	c = 1/sqrt(mu0 eps0) = f lambda

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

10. Ray optics and wave optics

Quantity / result	Formula or condition
Mirror formula	1/f = 1/v + 1/u (Cartesian signs)
Mirror magnification	m = -v/u
Thin-lens formula	1/f = 1/v - 1/u (Cartesian signs)
Lens magnification	m = v/u
Lens power	P = 1/f(metre); powers add for contact lenses
Lens maker in air	1/f = (n-1)(1/R1 - 1/R2)
Snell law	n1 sin(i) = n2 sin(r)
Critical angle	sin(C) = n2/n1 for n1 > n2
Prism at minimum deviation	n = sin((A+D_m)/2) / sin(A/2)
Small-angle prism	D_m approx (n-1)A
YDSE fringe width	beta = lambda D/d
Single-slit central width	2 lambda D/a
Malus law	I = I0 cos^2(theta)
Brewster law	tan(i_p) = n2/n1

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

11. Modern physics and electronic devices

Quantity / result	Formula or condition
Photon energy	E = hf = hc/lambda
Photoelectric equation	K_max = hf - phi = eV_s
de Broglie wavelength	lambda = h/p
Electron accelerated through V	lambda(angstrom) approx 12.27/sqrt(V)
Bohr radius	r_n = n^2 a0/Z
Bohr energy	E_n = -13.6 Z^2/n^2 eV
Hydrogen-like spectrum	1/lambda = R Z^2(1/n1^2 - 1/n2^2)
Nuclear radius	R_nucleus = R0 A^(1/3)
Mass-energy	E = mc^2
Binding energy	BE = Delta m c^2
Radioactive decay	N = N0 exp(-lambda t)
Half-life	T_1/2 = ln(2)/lambda
Mean life	tau = 1/lambda
Activity	A_activity = lambda N
Diode approximation	Forward bias conducts after material-dependent threshold; reverse current stays small before breakdown

Check before use

Write known quantities with SI units, state the positive direction or optical sign convention, identify the conservation law or model, and perform a dimension check on the final expression.

12. Constants and last-minute error traps

Constant	Useful value
Speed of light, c	2.998 * 10^8 m/s
Planck constant, h	6.626 * 10^-34 J s
Elementary charge, e	1.602 * 10^-19 C
Electron mass, m_e	9.109 * 10^-31 kg
Gravitational constant, G	6.674 * 10^-11 N m^2 kg^-2
Standard gravity, g	9.80665 m/s^2
Vacuum permittivity, eps0	8.854 * 10^-12 F/m
Vacuum permeability, mu0	approx 1.256637 * 10^-6 H/m
Boltzmann constant, k_B	1.381 * 10^-23 J/K
Gas constant, R	8.314 J mol^-1 K^-1
Avogadro constant, N_A	6.022 * 10^23 mol^-1
Electron volt	1 eV = 1.602 * 10^-19 J

Trap	Repair rule
Degrees vs radians	Angular SHM, calculus and omega relations require radians.
Mass vs weight	Mass is kg; weight is force mg in newtons.
Radius vs diameter	Moment of inertia, circular motion and capillary formulas use radius unless stated.
RMS vs peak	For sinusoidal AC, RMS equals peak/sqrt(2), not peak/2.
Mirror vs lens signs	Use one Cartesian sign convention consistently; do not memorise an isolated plus/minus.
Potential vs potential energy	V is energy per unit charge; U = qV for a charge in that potential.
Series vs parallel	Resistor rules and capacitor rules reverse their sum/inverse patterns.
Celsius vs kelvin	Gas laws, radiation and Carnot efficiency require absolute temperature.
Frequency vs angular frequency	omega = 2pi f.
Vector vs scalar	Momentum, force, field and torque need direction; energy and potential are scalar.

13. Source and syllabus coverage page

NMC NEET UG 2026 syllabus: https://www.nmc.org.in/MCIRest/open/getDocument?path=%2FDocuments%2FPublic%2FPortal%2FLatestNews%2FPublic+Notice_NEET_removed.pdf

NTA JEE Main 2026 syllabus page: https://jeemain.nta.nic.in/document/syllabus-2026/

NTA JEE Main 2026 syllabus PDF:
https://cdnbbsr.s3waas.gov.in/s3f8e59f4b2fe7c5705bf878bbd494ccdf/uploads/2025/10/202510311323551056.pdf

This formula sheet follows the main theory areas listed in the official 2026 Physics syllabi. The two examinations are not identical; verify experiment lists, deleted topics, paper pattern and current bulletin separately.

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Independent revision aid. Not issued by NMC, NTA, NEET or JEE Main.