

CUET PCM Formula Sheet

Free notes · Class 12 NCERT · Physics, Chemistry, Mathematics · CUET UG

How to use this sheet

★ CUET UG domain paper: 50 compulsory MCQs, 60 minutes, +5 for a correct answer, –1 for a wrong answer, 0 if left blank. Questions are based on the NCERT Class 12 syllabus. You can take up to 5 papers in total.

Revise one subject a day. Cover the right-hand side of each table and try to recall the formula before you read it.

1. Physics: electricity and magnetism

Topic	Key formula / fact
Coulomb's law	$F = kq_1q_2/r^2$, $k = 1/(4\pi\epsilon_0) = 9 \times 10^9 \text{ N m}^2 \text{ C}^{-2}$
Electric field and potential (point charge)	$E = kq/r^2$, $V = kq/r$
Parallel-plate capacitor	$C = \epsilon_0 A/d$; energy $U = \frac{1}{2}CV^2$
Capacitors	Series: $1/C = 1/C_1 + 1/C_2 \dots$ · Parallel: $C = C_1 + C_2 \dots$
Resistance	$R = \rho L/A$; $V = IR$; $P = VI = I^2R = V^2/R$
Drift velocity	$I = neAv_d$
Wheatstone bridge (balanced)	$P/Q = R/S$
Magnetic force	$F = qvB \sin \theta$; on a wire $F = BIL \sin \theta$
Magnetic field	Long wire: $\mu_0 I/2\pi r$ · Centre of loop: $\mu_0 I/2R$ · Solenoid: $\mu_0 nI$

2. Physics: EMI, AC, optics, modern physics

Topic	Key formula / fact
Faraday's law	$\epsilon = -d\Phi/dt$ (minus sign = Lenz's law)
AC circuit	$X_L = \omega L$, $X_C = 1/\omega C$, $Z = \sqrt{R^2 + (X_L - X_C)^2}$
Resonance, rms value	$f_0 = 1/(2\pi\sqrt{LC})$; $V_{\text{rms}} = V_0/\sqrt{2}$
Transformer	$V_s/V_p = N_s/N_p$
Mirror and lens	Mirror: $1/f = 1/v + 1/u$ · Lens: $1/f = 1/v - 1/u$ · Power $P = 1/f$ (f in metres)
Young's double slit	Fringe width $\beta = \lambda D/d$
Photoelectric effect	$K_{\text{max}} = h\nu - \phi_0$
de Broglie wavelength	$\lambda = h/p = h/mv$
Bohr model (hydrogen)	$E_n = -13.6/n^2 \text{ eV}$; $r_n \propto n^2$
Radioactive decay	$N = N_0 e^{(-\lambda t)}$; $T_{1/2} = 0.693/\lambda$

3. Chemistry: physical chemistry

Topic	Key formula / fact
Raoult's law	$p = x \cdot p^\circ$ (for each volatile component)
Colligative properties	$\Delta T_b = iK_b \cdot m$ · $\Delta T_f = iK_f \cdot m$ · $\pi = iCRT$
Cell EMF	$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$
Nernst equation (298 K)	$E = E^\circ - (0.059/n) \log Q$
Gibbs energy	$\Delta G^\circ = -nFE^\circ$; $F = 96500 \text{ C mol}^{-1}$
First-order reaction	$k = (2.303/t) \log([R]_0/[R])$; $t_{1/2} = 0.693/k$
Zero-order reaction	$t_{1/2} = [R]_0/2k$
Arrhenius equation	$k = A \cdot e^{(-E_a/RT)}$

4. Chemistry: inorganic and organic

- Lanthanoid contraction: steady decrease in size from La to Lu, so Zr and Hf have almost the same size.
- Common oxidising agents: KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$ (both in acidic medium).
- Coordination compounds: write the ligands in alphabetical order, then the metal with its oxidation state in Roman numerals.
- Named reactions to know: Wurtz, Sandmeyer, Finkelstein, Swarts, Kolbe, Reimer-Tiemann, Rosenmund, Etard, Clemmensen, Wolff-Kishner, aldol, Cannizzaro, Hofmann bromamide, Gabriel phthalimide.
- Order of basic strength in water (methyl): $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N} > \text{NH}_3$.
- Glucose + HI (heat) gives n-hexane, which shows that all six carbons are in a straight chain.

5. Mathematics

Topic	Key formula / fact
Inverse trig principal values	$\sin^{-1}: [-\pi/2, \pi/2]$ · $\cos^{-1}: [0, \pi]$ · $\tan^{-1}: (-\pi/2, \pi/2)$
Determinants	$ kA = k^n A $ · $ \text{adj } A = A ^{n-1}$ · $A^{-1} = \text{adj } A/ A $
Definite integral property	$\int_0^a f(x) dx = \int_0^a f(a-x) dx$
Linear differential equation	$dy/dx + Py = Q \rightarrow IF = e^{(\int P dx)}$, $y \cdot IF = \int Q \cdot IF dx$
Vectors	$a \cdot b = a b \cos \theta$ · $ a \times b = \text{area of parallelogram}$
Conditional probability	$P(A B) = P(A \cap B)/P(B)$
Bayes' theorem	$P(E_i A) = P(E_i)P(A E_i) / \sum P(E_j)P(A E_j)$
Linear programming	The optimum value lies at a corner point of the feasible region.

Quick check

Q1. Two capacitors of 3 μF and 6 μF are joined in series. What is the equivalent capacitance?

Answer: 2 μF , because $1/C = 1/3 + 1/6 = 1/2$.

Q2. The half-life of a first-order reaction is 10 minutes. What is k ?

Answer: $k = 0.693/10 = 0.0693 \text{ min}^{-1}$.

Q3. What is the principal value of $\cos^{-1}(-1/2)$?

Answer: $2\pi/3$, since $\cos^{-1}$ values lie in $[0, \pi]$.

Q4. A lens has a power of -2.5 D . What type of lens is it, and what is its focal length?

Answer: Concave (diverging) lens; $f = 1/P = -0.4 \text{ m} = -40 \text{ cm}$.

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