

CONSTANTS

Description	Value
Ideal gas constant (R)	$0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K} = 8.31 \text{ J}/\text{mol}\cdot\text{K}$
Molal freezing point depression constant for water (K_f)	$1.86^\circ\text{C}/m$
Molal boiling point elevation constant for water (K_b)	$0.51^\circ\text{C}/m$
Heat of fusion of water (ΔH_{fus})	$334 \text{ J}/g = 80 \text{ cal}/g = 6.01 \text{ kJ}/\text{mol}$
Heat of vaporization of water (ΔH_{vap})	$2260 \text{ J}/g = 540 \text{ cal}/g = 40.7 \text{ kJ}/\text{mol}$
Specific heat (s) of water (liquid)	$4.184 \text{ J}/g\cdot\text{K} = 4.184 \text{ J}/g\cdot^\circ\text{C} = 1.0 \text{ cal}/g\cdot^\circ\text{C}$
Dissociation constant of water (K_w)	1.0×10^{-14} at 25°C
Standard atmospheric pressure	$1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ torr} = 101.325 \text{ kPa}$
Speed of light in a vacuum (c)	$3.00 \times 10^8 \text{ m}/s$
1 calorie (cal)	4.184 J
1 watt (W)	1 J/s
Acceleration of gravity on Earth (g)	$9.80 \text{ m}/s^2$
Electron rest mass (m_e)	$9.11 \times 10^{-31} \text{ kg}$
Elementary charge (e)	$1.60 \times 10^{-19} \text{ C}$
Coulomb's constant (k_e)	$8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$
Gravitational constant (G)	$6.67 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2$
Avogadro's number (N_A)	$6.02 \times 10^{23} \text{ particles}/\text{mole}$
Density of water (ρ_w)	$1.00 \times 10^3 \text{ kg}/\text{m}^3$

FORMULAS

Mathematics

(a, b) denotes a vector with an x -component of a and a y -component of b .

Force and Motion

$$v_f = v_i + at$$

$$x_f = x_i + v_i t + \frac{1}{2} at^2$$

$$v_f^2 - v_i^2 = 2a(x_f - x_i)$$

$$a_c = \frac{v^2}{r}$$

$$\Sigma \mathbf{F} = m\mathbf{a}$$

$$F = -kx$$

$$F \leq \mu N$$

$$F = \frac{Gm_1m_2}{r^2}$$

$$P = \rho gh$$

FORMULAS (continued)

Energy, Momentum, and Heat Transfer

$$W = Fd$$

$$P = \frac{\Delta W}{\Delta t}$$

$$KE = \frac{1}{2}mv^2$$

$$PE = mgh$$

$$\mathbf{p} = m\mathbf{v}$$

$$PV = nRT$$

$$\Delta E = Q - W$$

Electricity and Magnetism

$$F = \frac{k_e q_1 q_2}{r^2}$$

$$R_S = R_1 + R_2$$

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$V = IR$$

$$P = IV$$

FORMULAS (continued)

Waves, Sound, and Light

$$T = 2\pi\sqrt{\frac{L}{g}}$$

$$v = f\lambda$$

$$v = \sqrt{\frac{T}{\mu}}$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$n = \frac{c}{v}$$

$$\frac{1}{f} = \frac{1}{s_i} + \frac{1}{s_o}$$

NOTES FOR SCIENCE—PHYSICAL SCIENCE TEST

Not all constants and formulas necessary are listed, nor are all constants and formulas listed used on this test.

While attention has been paid to significant figures, no answer should be considered incorrect solely because of the number of significant figures.

In questions on electricity and magnetism, the term *current* refers to "conventional current" and the use of the right-hand rule is assumed.