CAST Exam — Quick Reference

EEI Construction & Skilled Trades Test · Key Formulas & Tables

Electrical Fundamentals

Formula	Equation	When to Use
Ohm's Law (Voltage)	V = I × R	Find voltage from current & resistance
Ohm's Law (Current)	I = V / R	Find current from voltage & resistance
Ohm's Law (Resistance)	R = V / I	Find resistance from voltage & current
Power (1-Ø)	P = V × I	Watts from volts × amps
Power (from R)	P = I² × R	When current and resistance are known
Power (from R)	P = V² / R	When voltage and resistance are known
Series Resistance	Rt = R1 + R2 + R3	Resistors end-to-end (same current)
Parallel Resistance	1/Rt = 1/R1 + 1/R2 + 1/R3	Resistors across same two points

Work, Force, Energy, Power

Formula	Equation	Units / Notes
Work	W = F × d	ft·lb or joules
Power	P = W / t	work per unit time
Kinetic Energy	KE = ½ × m × v²	energy of motion
Potential Energy	PE = m × g × h	energy from height
Force	F = m × a	Newton's second law
Friction	f = μ × N	μ = coefficient of friction; N = normal force

Simple Machines — Mechanical Advantage

Machine	MA Formula	Example
Lever	MA = L_effort / L_load	Crowbar, seesaw

Pulley (fixed)	MA = 1	Changes direction only
Pulley (block & tackle)	MA = # supporting ropes	Lift heavy loads
Inclined plane	MA = Length / Height	Ramp
Wheel & axle	MA = R / r	Steering wheel, doorknob
Screw	MA = 2πr / pitch	High MA, short travel

Area, Volume & Unit Conversions

Measurement	Formula / Conversion
Rectangle area	$A = L \times W$
Triangle area	$A = \frac{1}{2} \times b \times h$
Circle area / circumference	$A = \pi \times r^2$ · $C = 2\pi \times r$
Cylinder volume	$V = \pi \times r^2 \times h$
Cone volume	$V = \frac{1}{3} \times \pi \times r^2 \times h$
Rectangular solid	$V = L \times W \times H$
Length	1 ft = 12 in = 30.48 cm
Volume	1 gal = 231 in^3 ≈ 3.785 L
Power	1 kW = 1.341 hp · 1 hp = 746 W
Energy	1 ft·lb ≈ 1.356 J
Temperature	°F = (°C × 9/5) + 32 · °C = (°F − 32) × 5/9

Reading Comprehension Strategy

- Read the question first, then scan the passage for keywords.
- Signal words — "however" (contrast), "therefore" (conclusion), "except" (pick the odd one out), "primarily" (main idea).
- Eliminate extreme-language answers ("always" / "never") unless the passage supports them.
- Pick the answer directly supported by the passage, not outside knowledge.

Test-Day Plan

- Total time: ~87 min. Target ≤45 seconds per question on the first pass; flag and return.
- Bring: government photo ID, test confirmation, water.
- Leave behind: phone, smart watch, notes, unapproved calculator.
- Eat before. Arrive 30 minutes early. Confident pace beats rushed guessing.

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