

The night before the ESAT

The short answer

Check your photo ID and Pearson confirmation, pack your bag, read the recall sheet once, then sleep.
No new mock, no new topic.

Tonight, in 45 minutes

1. **ID.** Your booking name must match your original, unexpired photo ID. Save the confirmation offline.
2. **Route.** Plan to arrive 30 minutes early.
3. **Recall.** Go through the sheet below from memory. Star at most three shaky items.
4. **Stop.** Set alarms, lay out clothes, go to bed.

Calculator, paper, watch, food and drink stay outside the room. The centre gives you an erasable notebook and pen.

Formula recall

Mathematics 1, plus only your own modules.

Mathematics 1

- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$; the discriminant $b^2 - 4ac$ sets the number of roots.
- Scale factor k : length k , area k^2 , volume k^3 . Percentage change: multiply by $1 \pm r/100$.
- Exact sin, cos, tan at $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$.
- Probability: multiply along a branch, add branches. Without replacement, the next denominator drops.

Mathematics 2

- $S_n = \frac{n}{2}[2a + (n-1)d]$; $S_\infty = \frac{a}{1-r}$ only when $|r| < 1$.
- $s = R\theta$, sector area $\frac{1}{2}R^2\theta$ in radians; $c^2 = a^2 + b^2 - 2ab \cos C$.
- $\log(xy) = \log x + \log y$, $\log(x^k) = k \log x$.
- $\frac{d}{dx}x^n = nx^{n-1}$; $\int x^n dx = \frac{x^{n+1}}{n+1} + C$ for $n \neq -1$.

Physics

- $R = V/I$, $P = IV = I^2R$; $V_s/V_p = n_s/n_p$ and ideal $V_p I_p = V_s I_s$.
- $v^2 - u^2 = 2as$, $F = ma$, $p = mv$, $E_k = \frac{1}{2}mv^2$, $E_p = mgh$.
- $E = mc\Delta T$, $\rho = m/V$, $p = h\rho g$, $v = f\lambda$. Half-life means repeated halving.

Chemistry and Biology

- $n = m/M_r$; at rtp $V = 24n \text{ dm}^3$; $c = n/V$ with V in dm^3 .
- $\Delta H \approx \sum E_{\text{broken}} - \sum E_{\text{formed}}$; one pH unit is a factor of 10 in $[\text{H}^+]$.
- Genetics: list alleles and gametes; independent events multiply.

Worked example

Worked example An ideal transformer feeding a resistor

An ideal transformer has 2400 turns on a 240 V primary coil and 120 turns on its secondary coil. The secondary is connected across a 12Ω resistor. Find the primary current.

$$\frac{V_s}{240} = \frac{120}{2400} = \frac{1}{20} \Rightarrow V_s = 12 \text{ V}.$$

$$I_s = \frac{V_s}{R} = \frac{12}{12} = 1 \text{ A}.$$

$$240I_p = 12 \times 1 \Rightarrow I_p = 0.05 \text{ A}.$$

Correct: fewer secondary turns means lower voltage and higher current on that side.

Trap: flipping the ratio gives 4800 V.

Tomorrow

Eat normally and arrive 30 minutes early. More than 15 minutes late and you may be turned away. Test the pen before the timer starts.

Each module is 40 minutes. Check the clock at 13, 26 and 38 minutes, and fill every blank before time runs out. If something goes wrong, raise your hand straight away.