A-Level Chemistry: **w25 11**

Question 11 (Answer: **C**)

- Moles: $1.00/28.0 = 0.0357$ (N_2 is diatomic – using 14.0 doubles the answer).
- Convert: $V = 2.00 \times 10^{-3}$ m^3 and $T = 40.0 + 273 = 313$ K.
- $p = nRT/V = (0.0357)(8.31)(313)/(2.00 \times 10^{-3}) = 4.64 \times 10^4$ Pa.

A-Level Chemistry: **w25 12**

Question 8 (Answer: **D**)

- $M_r = \rho RT/p$, with the density expressed per cubic metre.
- 2.62 g dm^{-3} is $2.62/0.001$ g m^{-3}, and 25 °C is 298 K.
- So $M_r = 2.62 \times 8.31 \times 298/(0.001 \times 101\,000)$; A and C use 25 instead of 298.

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<table>
<tr><td>2(a)</td><td>To ensure no air / other gas remains in the syringe</td></tr>
<tr><td>2(b)(i)</td><td><table>
<tr><td>$\sqrt{\frac{1}{Mr}}$</td><td>0.707</td><td>0.500</td><td>0.222</td><td>0.158</td><td>0.109</td></tr>
<tr><td>Rate of effusion /cm^{3}s^{-1}</td><td>4.63</td><td>3.27</td><td>1.45</td><td>1.26</td><td>0.71</td></tr>
</table></td></tr>
<tr><td>2(b)(ii)</td><td>Time (taken).</td></tr>
<tr><td>2(b)(iii)</td><td>size of hole</td></tr>
<tr><td>2(c)</td><td>M1 all 5 points plotted correctly.

M2 Straight line of best fit drawn</td></tr>
<tr><td>2(d)</td><td>Point most anomalous to the plotted line of best fit circled.

AND

If point above LOBF
(Measured rate of effusion is higher than the true rate predicted by LOBF.)
for this point …
measured / recorded (effusion) time < true / actual time

OR
If point below LOBF
(Measured rate of effusion is lower than the true rate predicted by LOBF.)
for this point …
measured / recorded (effusion) time > true / actual time</td></tr>
<tr><td>2(e)</td><td>Yes AND The graph / LOBF…
is a straight-line AND it goes through the origin.</td></tr>
<tr><td>2(f)</td><td>The results are not reliable as there is an anomalous result.</td></tr>
<tr><td rowspan="2">2(g)(i)</td><td>M1 Effusion rate = 50/31.6 = (1.58)
Correct value for $\sqrt{\frac{1}{Mr}}$ read from x-axis</td></tr>
<tr><td>M2 Value correctly converted to M.</td></tr>
<tr><td>2(g)(ii)</td><td>If calculated M > 16
(The average) M (of the other components) is greater than 16 / calculated value for g(i).</td></tr>
<tr><td>2(h)</td><td>(Rate of effusion) increases
AND
(At higher temperature) gas particles move more quickly.</td></tr>
</table>