Check F first

Year 11 Biology · fresh first

Complete first source F

Two cubic geometric cell models have edges A = 3 mm and B = 6 mm. For a cube, surface area = $6a^2$; volume = a^3; SA/V = surface area divided by volume; face-to-centre distance = a/2. These model sizes are chosen for readable arithmetic; they are not measured cell dimensions.

At 2 minutes the supplied idealised layer depth is 0.5 mm from every face of each cube. Central edge = max(a − 2d, 0). Fraction penetrated = 1 − (central edge/a)³. For this supplied interval, the layer starts at depth d_start = 0 mm when t_start = 0 min. Average front speed = Δdepth/Δtime = (d_end − d_start)/(t_end − t_start). This is the model's interval average, not a constant future speed, intrinsic diffusion coefficient or molecular flux. This one-time imposed layer is not a universal diffusion law.

A second supplied endpoint-time file, for those same edge groups but a different hypothetical comparison, lists A: 40, 44, 48 s and B: 88, 92, 96 s. Its endpoint rule, material and external solution are specified as the same. Each value is labelled an independent model sample. Temperature and stirring details are not supplied. These are invented numbers, not experimental measurements. The endpoint-time table and the imposed-layer calculation are separate model descriptions; do not mix their time measures.

Your explanation · words, directed marks or a sketch

What is supplied?
What is missing?
Which measures stay separate?

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Check F · The cube comparison

Complete first source F

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Complete first task F

1. Calculate each cube's surface area, volume, SA/V with units, and face-to-centre distance. Explain the difference between total surface and surface per unit volume.

2. Calculate each fraction penetrated at 2 minutes and the average front speed. Explain why a larger fraction does not establish a larger intrinsic diffusion speed.

3. For the separate endpoint-time file, calculate each mean and range. Give a supported comparison of the listed numbers, name an important missing condition, and suggest one way to improve the comparison. State whether an actual learner investigation has occurred.

Check F first · continued

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Stop here. Preserve the first work before reading F's later page.

Your explanation · words, directed marks or a sketch

Part 1 · reasoning
Part 2 · reasoning
Part 3 · reasoning