

ANSWERS

- a) Complete the table below by working out the mean/Average
 b) For 20°C calculate the rate showing how many s it would take to collect 1cm³ of gas. Show your working. = 7.64s to collect 1cm³
 c) Calculate the rate for 30°C. = 3.88s to collect 1cm³

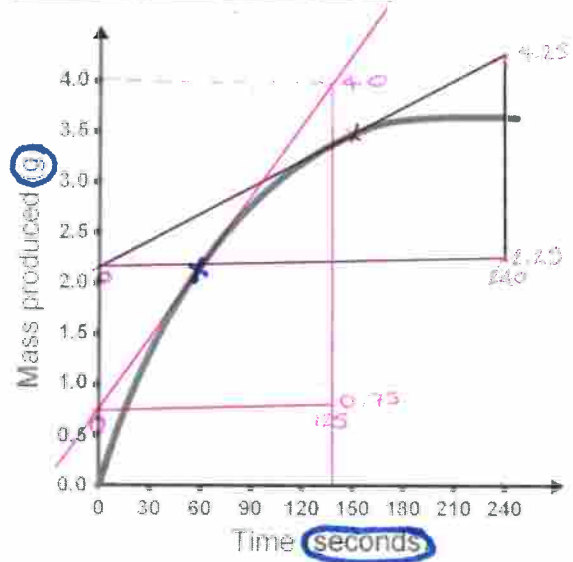
Temp (°C)	Time taken to collect 10cm ³ of gas (s)					Mean
15	87	95	102	121	117	104.4
20	67	78	61	90	86	76.4
25	57	59	48	66	51	56.2
30	47	45	39	42	21	38.8
35	118	123	145	136	132	130.8

Time (minutes)	Maltose Concentration (μM)
0	0
10	5.1
20	8.6
30	10.4
40	11.1
50	11.2
60	11.5

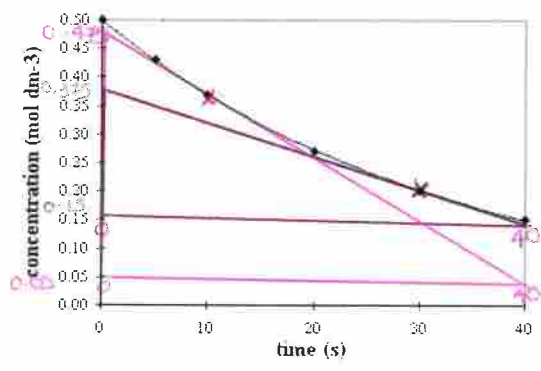
In 1hr = 60mins
 Answer (b) = 0.22 μM min⁻¹
 = 0.22 × 60 = 13.4 μM hr⁻¹

- a) Calculate the rate at which maltose is produced at 20 minutes. Show your working.
8.6 μM of maltose collected in 20mins = 8.6/20 = 0.43 μM min⁻¹
 b) Calculate the rate at which maltose is produced at 50 minutes. Show your working
11.2 μM of maltose collected in 50mins = 11.2/50 = 0.22 μM min⁻¹
 c) Can you convert your answer for (b) into μM per hour? Show your working

Calculating rates from a graph:



- a) Circle the most appropriate units.
 a. g/min
 b. kg min⁻¹
 c. g s⁻¹
 d. kg/s
 b) Calculate the rate at 60s, show your working
change in y / change in x = 3.25 / 125 = 0.026 g s⁻¹
 c) Calculate the rate at 150s, show your working.
2.00 / 240 = 0.008 g s⁻¹



- d) Identify appropriate units
mol dm⁻³ s⁻¹
 e) Work out the rate at 10s, show your working
0.425 / 10 = 0.0425 mol dm⁻³ s⁻¹
 f) Work out the rate at 30s, using the units mol dm⁻³ min⁻¹
0.225 / 40 = 0.006 mol dm⁻³ s⁻¹
0.006 × 60 = 0.338 mol dm⁻³ min⁻¹

Skill

Calculating mean

- 1) Add all values together
- 2) Divide by the no. of values you had.
- 3) Record to 1.d.p.

$$\text{eg } 15^{\circ}\text{C} = 87 + 95 + 102 + 121 + 117 = \frac{522}{5} = 104.4$$

- b) From table 76.4s to collect 10cm^3 of gas.
c) $76.4/10 = 7.64\text{s}$ to collect 1cm^3 of gas.

Q2

- a) To work out units look at the table.

- measurement unit is usually first eg cm^2 , mm^3 , mm
- time measurement second eg min, s, hr

for time we usually use $^{-1}$ or $/$ to represent "per"

eg mm min^{-1} or mm/min

Q3

- a) If you want to work out units look in table heading or graph axis
Remember the order of units as described in Q2(a) and decide
with "per" representation you want to use $= /$ or $^{-1}$
Note: Scientific units for "seconds" is s

- b) change in side of graph
change — bottom of graph

$$\text{At } 60\text{s} = 4 - 0.75 = \frac{3.25}{125 - 0 = 125}$$

$$\text{At } 150\text{s} = 4.25 - 2.25 = \frac{2.00}{240 - 0 = 240}$$

- 1) Put cross on point you're measuring rate of, DRAW YOUR TANGENT LINE.
Make this a long line so it crosses at least 1 axis to make reading graph easier.

- 2) DRAW YOUR TRIANGLE.

The bigger the triangle the more accurate it is.

- 3) Read off axis. READ Y AXIS, READ X AXIS.

- 4) Calculate. — UNITS

HINT: look at the gradient.

A steep gradient = faster rate

A shallow gradient = slower rate