

2.5 Passive and Active Transport

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS active 主动运输 • passive 被动运输 • diffusion 扩散 • facilitated diffusion 易化扩散
• osmosis 渗透

Objective

Build the skills to answer exam questions on **passive and active transport**.

You must be able to:

- distinguish **passive** 被动运输 (no ATP, down the gradient) from **active** 主动运输 (uses ATP, against the gradient)
- give examples of each
- explain the role of the concentration gradient

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ Passive transport

Passive transport moves substances **down** their concentration gradient (high → low) with **no energy** needed. Examples: diffusion, osmosis, facilitated diffusion.

■ Active transport

Active transport moves substances **against** the gradient (low → high) and **requires ATP**. A pump protein uses energy to push the substance the “wrong” way.

■ A worked example

The **sodium-potassium pump** uses ATP to push Na^+ out and K^+ in, both against their gradients — active transport.

■ Deciding which

Ask: is it moving **down** the gradient (passive, free) or **up** the gradient (active, needs ATP)? That tells you which type it is.

2 Practice

Now apply the methods above.

2.1 Does passive transport require ATP? [1]

2.2 In which direction (relative to the gradient) does active transport move a substance? [1]

2.3 Give one example of active transport. [1]

3 Exam-style questions

3.1 Active transport differs from passive transport because it [1]

A	B
C	D

A moves substances down the gradient

B requires ATP and moves against the gradient

C never uses proteins

D only moves gases

3.2 A cell pumps calcium ions out against their concentration gradient.

(a) State whether this is active or passive transport. [1]

(b) Explain why ATP is needed. [2]

3.3 Diffusion of oxygen into a cell needs no energy, but importing glucose against its gradient does. Explain the difference. [2]