

4.2 Fault Tolerance

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS fault tolerance 容错 • redundancy 冗余 • single point of failure 单点故障
• internet 互联网 • packets 数据包

Objective

Build the skills to answer exam questions on **fault tolerance**.

You must be able to:

- explain how **fault tolerance** 容错 lets a system keep working when part fails
- describe how **redundancy** 冗余 supports fault tolerance
- explain why the Internet is fault tolerant
- identify a **single point of failure** 单点故障

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Fault tolerance

A **fault-tolerant** system keeps working even when **part of it fails**.

■ Redundancy

Redundancy — having more than one path or copy — supports fault tolerance. The Internet is fault tolerant because packets can take **alternate routes** when a path goes down.

■ Single point of failure

A **single point of failure** is one component whose failure brings down the whole system. Redundancy removes it, but at extra **cost**.

2 Practice

2.1 Define fault tolerance.

[1]

2.2 State how redundancy supports fault tolerance. [1]

2.3 Define a single point of failure. [1]

3 Exam-style questions

3.1 Fault tolerance lets a system [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** fail completely
 - B** keep working when part of it fails
 - C** run faster
 - D** compress data

3.2 The Internet is fault tolerant because packets can [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** take alternate routes
 - B** be deleted
 - C** be encrypted
 - D** be sorted

3.3 A network has only one cable connecting two cities.

- (a) Name this weakness. [1]
- (b) State how to make the connection fault tolerant. [1]
- (c) State the trade-off of adding redundancy. [1]