

6.7 Potential Errors When Performing Tests

Name: _____ Class: _____ Date: _____ **Total: 8 marks**

KEY WORDS type i error 第一类错误 • type ii error 第二类错误 • power 功效

Objective

Build the skills to answer exam questions on **potential errors in tests**.

You must be able to:

- describe a **Type I error** 第一类错误 (rejecting a true H_0)
- describe a **Type II error** 第二类错误 (failing to reject a false H_0)
- describe the **power** 功效 of a test

1 Worked examples

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

- **Two kinds of error**
 - **Type I** — reject H_0 when it is actually **true** (a false alarm). Its probability is α .
 - **Type II** — fail to reject H_0 when it is actually **false** (a missed effect). Its probability is β .
- **Power**
Power = $1 - \beta$ — the probability of correctly detecting a real effect (rejecting a false H_0).

2 Practice

2.1 Define a Type I error. [1]

2.2 Define a Type II error. [1]

2.3 State what the power of a test measures. [1]

3 Exam-style questions

3.1 A Type I error is [1]

- **A** rejecting a true H_0
- **B** failing to reject a false H_0
- **C** a correct decision
- **D** a form of bias

3.2 The probability of a Type I error equals [1]

- **A** β
- **B** α
- **C** the power
- **D** 0

3.3 A drug that does **not** work is declared effective by a test.

- (a) Name this type of error. [1]
- (b) Name the error of missing a drug that **does** work. [1]
- (c) Name the probability of correctly detecting a real effect. [1]

Solutions

2.1 rejecting H_0 when it is actually true.

2.2 failing to reject H_0 when it is actually false.

2.3 the probability of correctly rejecting a false H_0 (detecting a real effect).

3.1 A.

3.2 B.

3.3 (a) a Type I error. (b) a Type II error. (c) power.