

3.5 Introduction to Experimental Design

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS control 对照 • treatments 处理 • experimental units 实验单位
• control group 对照组 • placebo 安慰剂

Objective

Build the skills to answer exam questions on **experimental design**.

You must be able to:

- identify the **experimental units** 实验单位, **treatments** 处理, factors, and **response** variable
- explain the roles of **control** 对照, **randomization** 随机化, and **replication** 重复
- describe a **control group** 对照组 and a **placebo** 安慰剂

1 Worked examples

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

■ Parts of an experiment

- **Experimental units** — the who or what being treated.
- **Treatments** — the conditions applied (set by the **factor**, the explanatory variable).
- **Response** — the outcome measured.

■ Three principles

- **Control** — compare against a baseline group.
- **Randomization** — assign units to treatments by chance.
- **Replication** — use enough units to see a real effect.

A **control group** gets no treatment or a **placebo** (a fake treatment) for comparison.

2 Practice

2.1 Name the three principles of experimental design. [2]

2.2 State the purpose of a control group. [1]

2.3 Define a placebo. [1]

3 Exam-style questions

3.1 Assigning units to treatments by chance is [1]

- **A** control
- **B** randomization
- **C** replication
- **D** bias

3.2 A fake treatment used for comparison is a [1]

- **A** factor
- **B** placebo
- **C** block
- **D** response

3.3 A trial gives half the patients a real pill and half a sugar pill.

- (a) Name the group given the sugar pill. [1]
- (b) Name the sugar pill itself. [1]
- (c) Name the principle of using enough patients. [1]

Solutions

2.1 control, randomization, replication.

2.2 to provide a baseline for comparison with the treated group(s).

2.3 a fake treatment given for comparison.

3.1 B.

3.2 B.

3.3 (a) the control group. (b) a placebo. (c) replication.