

10.2 The Process of Charging

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS conductor 导体 • insulator 绝缘体 • friction 摩擦 • induction 感应
• conduction 接触

Objective

Build the skills to answer exam questions on **the process of charging**.

You must be able to:

- distinguish **conductors** 导体 from **insulators** 绝缘体 by how freely charge moves
- explain charging by **friction** 摩擦, **conduction** 接触, and **induction** 感应
- describe how a charged object attracts a neutral one by **polarization** 极化
- apply **conservation of charge** 电荷守恒

1 Worked examples

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

■ Conductors and insulators

In a **conductor** (metal) charge moves freely; in an **insulator** (plastic, glass) it stays put.

■ Three ways to charge

- **Friction** — rubbing transfers electrons between materials.
- **Conduction** — touching a charged object shares charge.
- **Induction** — a nearby charge rearranges charge, then grounding removes some.

■ Polarization

A charged rod attracts a neutral object by pulling its opposite charges slightly closer — the near side becomes oppositely charged.

2 Practice

2.1 State the difference between a conductor and an insulator. [2]

2.2 Name the charging method in which two objects are rubbed together. [1]

2.3 Explain how a charged balloon sticks to a neutral wall. [2]

3 Exam-style questions

3.1 Charge moves freely through a [1]

A	B
C	D

A insulator

B conductor

C vacuum only

D neutral object

3.2 Charging by induction involves [1]

A	B
C	D

A rubbing two materials

B direct contact only

C bringing a charge near, then grounding

D heating the object

3.3 A negatively charged rod is brought near (but not touching) a neutral metal sphere on an insulating stand.

(a) Describe the arrangement of charge on the sphere. [2]

(b) State the net charge on the sphere. [1]