

3.7 Class Variables and Methods

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

KEY WORDS static variable 静态变量 • static (class) variable 类变量
• instance variables 实例变量 • constructor 构造函数

Objective

Build the skills to answer exam questions on **class variables and methods**.

You must be able to:

- declare a **static variable** 静态变量 shared by every object of a class
- understand that a static variable belongs to the **class**, not any single object
- write a **static method** that does not act on an individual object's state

1 Worked examples

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

■ Static (class) variables

A **static variable** is shared by **every** object of the class — there is only **one** copy, belonging to the class itself. It is useful for a shared count or a constant.

■ Static methods

A **static method** belongs to the class and does **not** act on an individual object's state (so it uses no instance variables directly).

2 Practice

2.1 State what a static variable is shared by. [1]

2.2 State whether a static variable belongs to the class or to each object. [1]

2.3 State one use of a static variable. [1]

3 Exam-style questions

3.1 A static variable is [1]

- **A** unique to each object
- **B** shared by all objects of the class
- **C** a local variable
- **D** a parameter

3.2 A static method [1]

- **A** acts on one object's state
- **B** does not act on an individual object
- **C** requires **new**
- **D** is a constructor

3.3 A class counts how many objects have been created, using a shared count.

(a) Name the kind of variable used for the count. [1]

(b) State what it belongs to. [1]

(c) State whether each object has its own copy of it. [1]

Solutions

2.1 every object of the class.

2.2 the class.

2.3 a shared count, or a class constant (any one).

3.1 B.

3.2 B.

3.3 (a) a static variable. (b) the class. (c) no — there is one shared copy.