

# 國立高雄師範大學九十一學年度碩士班招生考試試題

系所別：科學教育研究所

科目：自然科教材教法(化學) (共 2 頁，第 1 頁)

一、(a) 根據 Hegarty-Hazel (1986) 與 Tamir (1989) 等人的分類，探究式實驗教學的實施方式可依其開放程度分成零探究 (即傳統的驗證式)，引導式探究，和開放式探究。

請問探究式 (Inquiry) 的實驗與驗證式的實驗有何不同？(5%)

(b) 請以國中理化或高中化學的某一單元為例，設計一個探究式的實驗。並且列舉至少兩種該實驗的正確實施方式。(10%)

二、(a) Glynn (1989) 曾經發展類比教學的模式 (Teaching with analogies model)。請說明該模式 (或一般類比教學) 的教學步驟應該包括哪些？(5%)

(b) 請以「化學平衡」為例，說明你的類比教學步驟。(10%)

三、(a) 設計兩階段式選擇題 (Two-tier multiple choice) 時，一般而言會依據哪些步驟？(10%)

(b) 請以電化電池的單元內容為例，設計一題兩階段式選擇題。(10%)

四、教學評量在學生的學習過程中有其重要性。請回答下列有關教學評量的問題：

(a) 在化學課中，教學評量的目的為何？(5%)

(b) 在化學課中，正確使用化學符號是很重要的能力。你要如何評量學生使用化學符號的能力。  
(10%)

五、九年一貫課程在今年的九月即將於國小國中全面實施。請回答下列問題：

(a) 作為一個化學 (理化) 教師或自然科教師，你如何把握其精神，發展你的教材？(10%)

(b) 如果以「生活用水」為主題，根據前面的精神及主旨，試列出你的單元內容綱要，並敘述其彼此間的關聯。(10%)

六、以下附件是一篇有關胃潰瘍的報導。假如你是一位化學教師，以本篇報導作為教學單元，請回答下列問題：

(a) 訂定此單元的教學目標。(5%)

(b) 設計一個教學計畫綱要，以達成前述的教學目標。(10%)

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## **New ideas for old**

### ***Stress or bugs?***

Sometimes scientists think they have reached an understanding of a problem but then have to rethink it because a researcher has discovered some new data that doesn't fit in with the agreed interpretation. A recent example of scientists changing their minds has been in the treatment of stomach ulcers. For many years, doctors believed that people got stomach ulcers because their stressful lives caused their stomachs to make too much acid.

They believed that this acid caused damage to the lining of the stomach, resulting in an ulcer. To treat the ulcers, doctors prescribed drugs that reduced the amount of acid the stomach produced; this allowed the ulcers to heal, but they often came back. Patients with ulcers were advised that to keep their ulcers away they should take it easy and stop worrying, but this didn't always seem to help. Their ulcers kept coming back.

In 1983, an Australian scientist called Barry Marshall was using a microscope to look at pieces of ulcers, which had been removed from patients' stomachs, when he saw something that no one had ever noticed before – there were bacteria living among the cells in the stomach lining. Similar tissue from people with healthy stomachs had no bacteria.

For at least a century scientists had believed that no bacteria can live in the stomach. Dr Marshall wondered if the bacteria might have something to do with causing stomach ulcers. He developed a way of growing the bacteria in his laboratory and carried out tests to find out which antibiotics killed the bacteria. He then designed some experiments to test the idea that the bacteria cause ulcers. He tried treating ulcer patients with antibiotics. Eventually he found a treatment that got rid of the bacteria in the stomach and, once they were gone, the patients' stomach troubles seemed to be much better. In the extreme, Barry Marshall even did an experiment in which he drank a mixture containing the bacteria. He soon began to have the same painful stomach problems as ulcer patients.

It took 10 years to convince about 10 per cent of doctors that most ulcers are caused by bacteria. But now many more doctors have accepted the theory and use antibiotics to treat ulcers successfully. There are still some, however, who either haven't heard of the new idea or refuse to believe it.

There is still a great deal to learn about how these bacteria damage the stomach. Perhaps stress does help to cause ulcers, but the new understanding of the role bacteria play in this condition has been a big help to people with stomach ulcers. Many patients who suffered for years with stomach ulcers have been cured by a two-week course of antibiotics.

Scientists had been studying the stomach ulcer problem for years. Why did it take so long to find this bacterium? Why did people have to suffer stomach problems for so many years? It's because the scientists studying the problem believed that bacteria could not survive in the high acidity of the stomach. No scientist had ever had the idea that bacteria might be involved and so no one had ever looked for bacteria in the wall of the stomach. One of the greatest challenges for scientists is to keep an open mind and to keep having new ideas. Ideas aren't facts and other scientists may disagree with them but science would not be possible without them.