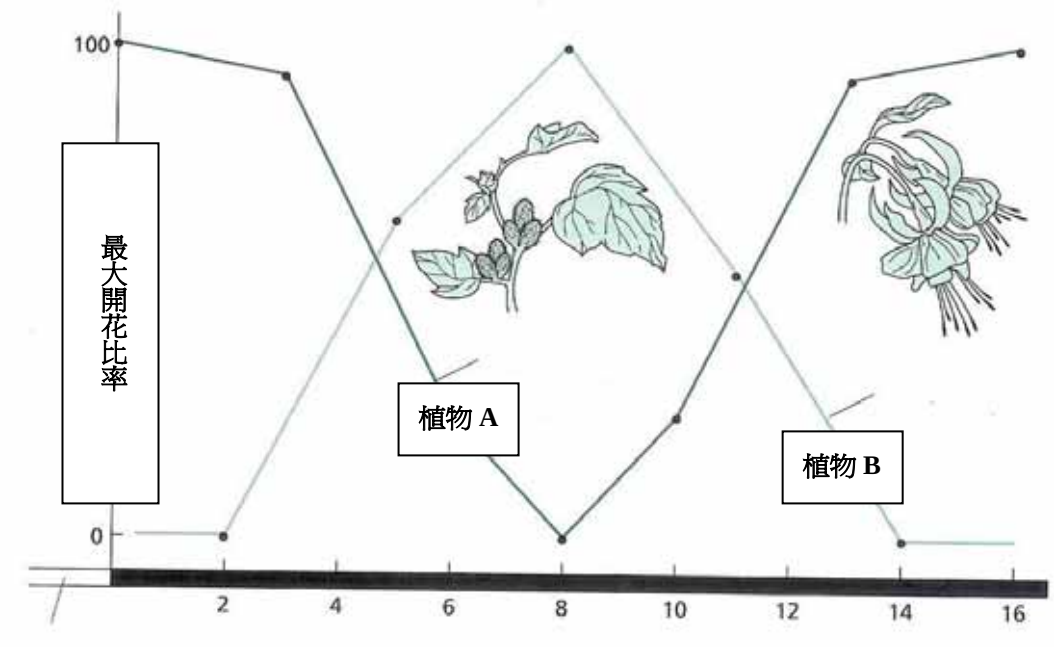
國立彰化師範大學 96 學年度博士班招生考試試題

系所： 科學教育研究所　　**組別：** 丁組　　**科目：** 基礎生物

☆☆請在答案紙上作答☆☆　　

問答題(共 7 題)：

1. 將蛙胚發育爲口部的外胚層組織，移殖到蠑螈胚胎口部的位置，而該位置原來的外胚層已先移除，後來的移殖物順利發育爲蛙的口。試就細胞生理學的知識說明理由。(15 分)
2. 試說明神經系統訊息傳遞的機制。(10 分)
3. 何謂抗體？試就其構造說明抗體的作用，並說明抗體在免疫反應所扮演的角色(包括 B 細胞、T 細胞的作用機制)。(15 分)
4. 你認爲(1)赤道、南極、潮間帶、河口與沿岸五種環境中，哪一類型海洋的營養源最貧乏？ (2)赤道、南極、溫帶、高山與沙漠五種環境中，哪一類型的植被最複雜？請分別說明理由。(15 分)
5. 請分別繪出典型的原生質膜、核膜及粒線體膜的構造，並標示其細微結構(fine structure)名稱。(15 分)
6. 下圖爲植物學家利用打破暗期影響植物開花的相關實驗結果，圖中「植物 A」打破暗期的處理方式爲紅光照射 1 分鐘，「植物 B」打破暗期的處理方式爲紅光照射 1 小時。據此結果下列敘述哪些正確？（A）暗期愈短「植物 A」愈容易開花，超過 8 小時暗期則效果相反（B）暗期愈長「植物 B」愈容易開花，超過 8 小時暗期則效果相反（C）推測「植物 A」爲長日照植物（D）推測「植物 B」爲中性植物（E）此實驗結果告訴我們影響植物開花，暗期比光期重要。請複選其答案，並說明其理由。(15 分)



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7.請根據下文說明文內粗體字(elicitors 等)之間的關係或作用。(15 分)

Plant Responses to Pathogen Invasions

In contrast to the strain-specific *Avr-R* interactions that control plant disease resistance to very narrow groups of pathogens (specifically, strains that contain the appropriate *Avr* allele), molecules called **elicitors** induce a broader type of host defense response. **Oligosaccharins**, derived from cellulose fragments released by cell wall damage, are one of the major classes of elicitors. Elicitors stimulate the production of antimicrobial compounds called **phytoalexins**. Infection also activates genes that produce **PR proteins** (pathogenesis-related proteins). Some of these proteins are antimicrobial, attacking molecules in the cell wall of a bacterium, for example. Others may function as signals that spread "news" of the infection to nearby cells. Infection also stimulates the cross-linking of molecules in the cell wall and the deposition of lignin, responses that set up a local barricade that slows spread of the pathogen to other parts of the plant.

If the pathogen is avirulent based on an *R-Avr* match, then the localized defense response is even more vigorous and is known as a **hypersensitive response** (abbreviated **HR**). There is an enhanced production of phytoalexins and PR proteins, and the "sealing" response that contains the infection is more effective. After the cells at the site of infection mount their chemical defense and seal off the area, they destroy themselves. We can see the result of an HR as lesions on a leaf or other infected organ. As "sick" as such a leaf appears, it will still survive, and its defense response will then help protect the rest of the plant **(Figure 39.31)**.