

(作答時不必抄題，但須標明題號)

- 一、請翻譯並說明 thinning out 與 heading back，並以植物生理觀點解釋兩種園藝技術對植物之影響。(10分)
- 二、請詳述下列植物生長調節劑相關問題。(共計 30 分)
  - (1) 請翻譯並說明 growth retardants 之作用機制與園藝上之效用，並列舉至少一例相關製劑。(本小題 8 分)
  - (2) 請分別說明乙烯(ethylene)對臺灣鳳梨產業及綠豆芽生產之主要功用及做法，並分別列舉一種乙烯釋放劑及乙烯抑制劑名稱。(本小題 12 分)
  - (3) 請問生長素(auxin)主要在植物體什麼部位產生？運輸的方向通常為何？抑制 auxin 運移之調節劑對植物可能有哪些影響，有何園藝應用？列舉至少二種人工合成之 auxin 類藥劑名稱。(本小題 10 分)
- 三、請從插穗的種類、操作方式、環境、事後照顧等各面向說明扦插應注意事項及原理。(10分)
- 四、環境因子影響植物生長發育及作物生產品質甚鉅，尤其是溫度、光及水分這三大因子的變化經常是園藝作物生產的關鍵。請根據各小題之生產目標，說明該園藝作物生產時的主要調控因子及其調控技術的機制與其如何調節(調節策略)。(每小題 10 分，共計 30 分)
  - (1) 設施內蝴蝶蘭產期調節
  - (2) 蘋果果實著色均勻
  - (3) 洋香瓜果實糖度提升
- 五、請在閱讀完下列短文後，依照文章內容回答問題。(共計 20 分)

The changing global climate and human activities have immensely impacted the production and productivity of horticultural crops. The abiotic stress condition has led to various environmental restrictions such as salinity, sodic alkaline, drought, temperature fluctuations, and heavy metal exposure. These factors can significantly affect plant growth, yield, and quality. Understanding the effects of abiotic and biotic stresses on horticultural crops and the mechanisms involved in mitigating these stresses can significantly improve crop productivity and quality, and researchers can help develop new strategies to enhance the resilience of horticultural crops to environmental stresses.

The regulation of stress response involves a significant mechanism known as phytohormonal cross-talk. Researchers have utilized epigenomics, genomics, proteomics, and metabolomics methodologies to comprehend the reaction of horticultural crops toward abiotic stress. Osmotic adjustments and reactive species signaling are two key mechanisms involved in the response of horticultural crops to abiotic and biotic stress. Transcriptional and translational regulation is essential in stress response in these crops. Researchers are also exploring the application of novel phytoprotectants to mitigate stress in horticultural crops. Additionally, there is increasing interest in understanding the mechanistic insights of Plant Growth Promoting Rhizobacteria (PGPR) in regulating stress conditions in horticultural crops. PGPR-mediated regulation has been shown to improve the tolerance of crops to abiotic and biotic stresses.

(文章摘錄自 <https://doi.org/10.3389/fpls.2023.1212982>)

  - (1) 請問這篇文章的主題可能與何種議題有關?(本小題 5 分)
  - (2) 請問“ epigenomics, genomics, proteomics, and metabolomics methodologies ”分別指的是哪些方面的方法策略?(本小題 5 分)
  - (3) 園藝作物面對 abiotic stress 的反應機制，可以從哪些層面去探討?(本小題 10 分)