

(請依題號順序作答)

1. Please outline and describe the composition of nucleosome in plant cells, and describe how it regulates gene expression. (10%)
2. Please describe how nuclear pore complex involves in protein transport into the nucleus. (5%)
3. Please describe the inner-membrane systems of chloroplast and how protein imports into chloroplast. (10%)
4. Please describe how secreted proteins translocate in plant cells. (15%)
5. Please describe how cytoskeleton functions in plant cells in terms of cell wall. (10%)
6. The steroid hormones, estrogen and thyroid hormone receptor, are synthesized from cholesterol. Describe two signal transduction pathways, which are conducted by estrogen and thyroid hormone receptor, separately, mediating gene expression. (10%)
7. Describe the functions of maturation promoting factor (MPF) in mitosis. Answer should include cyclin B and Cdk1. Also, describe the role of p53 in G_1 arrest. (10%)
8. Describe the functions and downstream signal transducers of G protein-couple receptors and protein-tyrosine kinase receptors. (10%)
9. Describe the difference of C3, C4, and CAM plants in terms of their anatomical structures and metabolism pathways. (10%)
10. A plant biologist wants to know the localization of protein Xu within plant cells. He fuses Xu gene to green fluorescent protein (GFP) gene, and also creates a transgenic Arabidopsis over-expressing Xu-GFP protein. Then, He uses confocal microscope to visualize the leaves of transgenic plants to localize Xu-GFP within cells. (1) He observes fluorescent signals with red color, why? (2) Which tissue is the best specimen for this experiment if Xu-GFP can be expressed in the whole Arabidopsis. Why? (3) If no GFP signal is observed under confocal microscope, what factors may contribute to this result. (10%)

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