

- (1) Please describe the process (molecular mechanisms) of transporting proteins into and out of the nucleus through the nuclear pores (8%)
- (2) Please describe how EGF receptor acts through Ras-dependent and Ras-independent pathways to promote cell proliferation (8%)
- (3) Please describe the distinct mechanisms for converting proto-oncogenes into oncogenes (9%).
- (4) How do you do immunocytochemistry in the electron microscope level? (5%)
- (5) How to demonstrate GTP hydrolysis is required for MT's dynamic instability but not for MT's assembly? (5%)
- (6) How does a migrating cell use myosin and actin for the protrusion and forward movement? (5%)
- (7) Why does collagen assembly only occur in extracellular space? (5%)
- (8) Describe an experiment to demonstrate that tight junctions create a permeability barrier. (5%)
- (9) What is an amphipathic molecule? Why are amphipathic molecules important constituents of membranes? What does it mean to say that a membrane is "selectively permeable"? (8%)
- (10) There are three kind of coated vesicles known to be involved in intracellular transport. What are they? Pick one and give its transport origin and final destination. (5%)
- (11) Please explain the following terms: (12%)
 - (a) fluid mosaic model
 - (b) endomembrane system
 - (c) molecular chaperone
- (12) 神經細胞之 resting membrane potential 是如何形成? resting membrane potential 到底是定值還是非定值? 若 resting membrane potential 若非定值, 請問可能是受到什麼影響? (9%)
- (13) 研究 ion channel 的特性與功能時, 科學家長常常利用 patch clamp 的技術來研究. 請問到底 patch clamp 是測量些什麼東西? 為何利用 patch clamp 技術就可以研究 ion channel 的特性與功能? (8%)
- (14) synapse 可以分 electrical synapse 與 chemical synapse 兩種, 請說明兩種 synapse 各有那些無法被取代的優點? 使得在演化過程兩種 synapse 都被保留下來(8%)