

Answer the following questions

1. Explain the difference between oxidative phosphorylation and substrate-level phosphorylation (10%).
2. Glucose is the product during photosynthesis, the following reaction formula:  
$$6\text{CO}_2 + 12 \text{H}_2\text{O} + \text{light energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$$
Is better than the following equation:  
$$6\text{CO}_2 + 6\text{H}_2\text{O} + \text{light energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$$
Why (10%)?
3. What is the difference between tracheid and vessel? Why vessel has the evolutionary advantage over tracheid in terms of water transport (10%)?
4. Use figure to show a longitudinal section of a rice seed and label each tissue. Explain where and how gibberellin (GA) activates the production of  $\alpha$ -amylase (10%).
5. What sensory receptor(s) and phytohormone is responsible for guard cell opening and closing, respectively (5%).
6. How plant defense itself when invaded by a virus, bacterium, fungus, or nematode (5%)?
7. Please explain the following processes in plant seed development:  
(a). double fertilization (b). apomixes and parthenocarpy (10%)
8. What are the mechanism of vernalization and photoperiod in affecting flowering process in plant? (10%)
9. In both roots and stems, what are the developments by three meristematic areas of the apical meristem? (7%)
10. Please give five examples of specialized roots and two specialized leaves in plant, and explain its function. (5%)
11. What are hydathodes and guttation? (8%)
12. Please describe the synergistic function of auxin and cytokinin. (10%)