1. What type of reactions use thiamin as a necessary cofactor? Does the pyrimidine ring or thiazole ring play a greater part in the reaction mechanism?

2. Provide three reasons that alcoholics may be deficient in thiamine. What disease might result from chronic deficiency state?

3. Cytochrome P450 reductase (CPR) is an enzyme responsible for the reduction of a large portion of cytochrome P450 (CYP) enzymes. What color would you expect a purified solution of CPR to be, assuming all enzyme was in the oxidized state? Do you predict any change in the color of the CPR when CYP3A4 and excess NADPH are added to the solution?

4. What is the coenzyme form of Vitamin B₆ and why is it contraindicated with levo-DOPA therapy?
5. How does PLP control carbon atom reactivity in PLP-dependent reactions?

6. How is low Vitamin B₆ diagnosed?

7. What three forms of tetrahydrofolate are essential for the synthesis of nucleic acids? What is their functional role?

8. Describe the therapeutic strategy of “Leucovorin rescue”.

9. Why is folate an especially important vitamin in women that are considering becoming pregnant or that are pregnant?

10. How does Vitamin B₁₂ deficiency promote folate deficiency, in biochemical terms?

11. Why do alcoholics frequently suffer from folate deficiency?
12. What is the chemical difference between the folic acid in vitamin supplements and dietary sources?

13. What two classes of enzymes use Vitamin B₁₂ as a cofactor? What are their main function?

14. What is the role of “intrinsic factor” in Vitamin B₁₂ physiology? Why do elderly patients often need B₁₂ supplementation?

15. What are the vitamer forms of B₁₂? Which one participates in the classes of B₁₂-dependent enzymes referred to in question 13?

16. What test is done to check for cobalamine deficiency?

17. What type of chemical reactions is Coenzyme A used for and what vitamin is converted to Coenzyme A?

18. Biotin deficiency has been shown to cause loss of hair. Therefore, everyone should use shampoo and conditioner full of biotin to promote hair health. True or false.
19. Please show how NAD or NADP can be used to desaturate a carbon-carbon bond.

20. What disease commonly occurred in the “corn belt” of the US in the 1900’s? What could have remedied this situation?

21. What is a major function of Vitamin C in the cell?

22. Bonus Question: What Nobel Prize winner claimed that mega-dosing (multiple grams/day) of Vitamin C was “How to Live Longer and Feel Better”? Do you agree or disagree with the efficacy of high intake of Vitamin C in prevention of disease?