1. **Excess dietary calcium in relation to phosphorus causes:**
   A. Increased Ca absorption
   B. Ca phosphate formation which is insoluble
   C. Higher P absorption
   D. Vitamin D toxicity

2. **Excess dietary phosphorus in relation to calcium leads to:**
   A. Greater Ca absorption
   B. Ca incorporated into Ca phosphate salt
   C. Bone softening
   D. Increased milk yield

3. **Nutritional secondary hyperparathyroidism can result from:**
   A. Excess calcium
   B. Excess phosphorus
   C. Lack of sulfur
   D. Low magnesium

4. **Urinary calculi may result from:**
   A. Excess dietary phosphorus
   B. Vitamin E deficiency
   C. Low sodium
   D. Low chloride

5. **About 50% of the body's magnesium is found in:**
   A. Muscle
   B. Bone
   C. Blood
   D. Hair

6. **More than 300 enzymes are activated by:**
   A. Calcium
   B. Magnesium
   C. Potassium
   D. Iron

7. **Hypomagnesemia (grass tetany) occurs mainly in:**
   A. Horses on dry hay
   B. Cattle on lush, rapidly growing pasture
   C. Pigs in confinement
   D. Poultry on high-protein diets

8. **Providing trace mineral supplements with magnesium helps prevent:**
   A. Anemia
   B. Grass tetany
   C. Goiters
   D. Milk fever

9. **Electrolytes help maintain:**
   A. Vision and hearing
   B. Osmotic pressure and acid-base balance
   C. Bone density
   D. Protein synthesis

10. **Sodium and chloride are mainly:**
   A. Intracellular components
   B. Extracellular components
   C. Enzymes
   D. Hormones

11. **Potassium is primarily an:**
   A. Extracellular component
   B. Intracellular component
   C. Enzyme activator
   D. Hormone

12. **The Na/K pump helps maintain:**
   A. Membrane potential
   B. Blood calcium levels
   C. Thyroid function
   D. Vitamin transport

13. **Deficiencies in potassium, sodium, or chlorine cause:**
   A. Hair loss
   B. Depressed growth
   C. Fever
   D. Bone deformities

14. **Equine HYPP Disease is also known as:**
   A. Grass tetany
   B. Impressive Syndrome
   C. Blind staggers
   D. Alkali disease

15. **Equine HYPP is caused by:**
   A. Copper deficiency
   B. Inherited genetic mutation (dominant)
   C. Excess sulfur
   D. Iodine deficiency

16. **Inorganic sulfur is:**
   A. Essential for normal function
   B. Not essential for normal productive function
   C. A hormone
   D. A vitamin

17. **Sulfur-containing amino acids and vitamins are:**
    A. Inorganic
    B. Organic metabolites
    C. Enzymes
    D. Hormones

18. **N:S ratio for total diet in ruminants should be:**
    A. 5:1
    B. 10:1
    C. 1:1
    D. 2:1

19. **Excess sulfur can tie up:**
    A. Copper
    B. Calcium
    C. Iron
    D. Sodium

20. **Polioencephalomalacia (feedlot disease) is associated with:**
    A. Excess sulfur
    B. Lack of zinc
    C. Vitamin E toxicity
    D. Sodium deficiency

21. **Cobalt is a structural component of:**
    A. Vitamin A
    B. Vitamin B12
    C. Vitamin D
    D. Vitamin K

22. **Cobalt deficiency in ruminants causes:**
    A. Goiter
    B. Anemia
    C. Muscle dystrophy
    D. Hair loss

23. **Iodine is a component of which hormones?**
    A. Estrogen
    B. T3 and T4
    C. Insulin
    D. Cortisol

24. **Iodine deficiency causes:**
    A. Goiters
    B. Tetany
    C. Anemia
    D. Bone deformities

25. **Zinc deficiency causes:**
    A. Parakeratosis
    B. Blind staggers
    C. Goiters
    D. Milk fever

26. **High calcium levels can interfere with absorption of:**
    A. Zinc
    B. Iron
    C. Sulfur
    D. Manganese

27. **Iron is mostly found in:**
    A. Liver
    B. Hemoglobin and myoglobin
    C. Stomach
    D. Pancreas

28. **Copper deficiency is most common in:**
    A. Pigs
    B. Ruminants
    C. Horses
    D. Poultry

29. **Selenium functions as a(n):**
    A. Antioxidant
    B. Hormone
    C. Electrolyte
    D. Vitamin

30. **Chromium potentiates the action of:**
    A. Vitamin D
    B. Insulin
    C. Calcium
    D. Thyroxine