1. The most active form of Vitamin D is 1, 25 dihydroxycholecalciferol, and this final hydroxylation takes place in:
   a. skin
   b. liver
   c. kidney
   d. skin and liver
   e. liver and kidney

2. Which of the following changes in serum analyte concentration are associated with hypercalcemia and hyperparathyroidism?:
   a. low phosphorous, and low Vitamin D₃
   b. high phosphorous, and low Vitamin D₃
   c. low phosphorous, and high Vitamin D₃
   d. high phosphorous, and high Vitamin D₃
   e. normal phosphorous and Vitamin D₃

3. Which of the following changes in serum analytes are associated with rickets and Vitamin D deficiency?:
   a. low calcium, and low phosphorous
   b. low calcium, and high phosphorous
   c. high calcium, and low phosphorous
   d. high calcium, and high phosphorous
   e. calcium and phosphorous normal

4. Osteoporosis can be differentiated from osteomalacia by which of the following combinations of serum analyte levels?:
   a. low Ca, normal P, high alkaline phosphatase
   b. high Ca, normal P, low alkaline phosphatase
   c. high Ca, high P, normal alkaline phosphatase
   d. normal Ca, normal P, high alkaline phosphatase
   e. normal Ca, normal P, normal alkaline phosphatase

5. The best biochemical marker of bone turnover is:
   a. Urine hydroxyproline
   b. Serum osteocalcin
   c. Serum bone alkaline phosphatase
   d. Urine \(\gamma\)-carboxyglutamic acid
   e. Urine N-terminal teleopeptides

6. Peak bone mass is the:
   a. Maximum bone mass attained by a fetus
   b. Maximum bone mass attained by an individual
   c. Not affected by genetics of environmental factors
   d. Maximum bone mass attained by postmenopausal women
   e. Maximum bone quality achieved in puberty
7. Which of the following treatments does not increase the risk for secondary osteoporosis?
   a. Chronic glucocorticoid therapy
   b. Methotrexate
   c. Insulin
   d. Cyclosporin A
   e. Long-term treatment with phenobarbital or phenytoin.

Use the following Key to answer Questions 8-13:
   a. 1, 2, and 3 are correct
   b. 1 and 3 are correct
   c. 2 and 4 are correct
   d. only 4 is correct
   e. all are correct

8. Which of the following are causes of hypermagnesemia?:
   1. magnesium sulfate therapy
   2. magnesium-continuing antacids
   3. renal failure
   4. thyrotoxicosis

9. The primary target organs for Vitamin D₃ action are:
   1. kidney
   2. intestine
   3. bone
   4. parathyroid gland

10. Which of the following changes are associated with renal parenchymal disease?:
    1. decreased serum calcium
    2. increased parathyroid hormone
    3. decreased calcitriol synthesis
    4. decreased serum phosphorous concentration

11. Which of the following are important in regulating plasma calcium levels?
    1. parathyroid hormone (PTH)
    2. calcitonin
    3. 1, 25, dihydroxyvitamin D₃
    4. aldosterone

12. Which of the following factors are determinants of bone health?
    1. Nutritional
    2. Gonadal steroids
    3. Exercise
    4. Environmental lifestyle factors
13. Osteoporosis is primarily a disease of:
   1. Infants
   2. Postmenopausal women
   3. Former athletes
   4. Men and women older than 70 years

**Answer:**
1. c (p. 513)
2. c (p. 525, 527)
3. a (p. 522-523)
4. e (p. 517)
5. e (p. 510-511)
6. b (p. 508-509)
7. a (p. 524)
8. a (p. 513, 514, 516)
9. e (p. 511-512)
10. c (p. 518, 520)