VITAMINS & MINERALS

1. Thiamine is vitamin

(a) B1 (b) B2
(c) B6 (d) B12

2. The iron stored in intestinal mucosal cells is complexed to

(a) Ferritin (b) Intrinsic factor
(c) Oprelvekin (d) Transcobalamin II
(e) Transferrin

3. Which of the following is most likely to be required by a 5-year-old boy with chronic renal in sufficiency?

(a) Erythropoietin (b) G-CSF
(c) Interleukin - 11 (d) Stem cell factor
(e) Thrombopoietin

4. in adults, approximately _____ mg of thiamine per day is completely degraded by the tissue

(a) 0.01 (b) 0.1
(c) 1 (d) 10

5. The drug of choice for the management of osteoporosis caused by high-dose use of glucocorticoids is

(a) Alendronate (b) Calcitonin
(c) Mestranol (d) Oxandrolone
(e) Vitamin D

6. Which of the following drugs is correctly associated with its clinical application?

(a) Erythropoietin : Macrocytic anemia
(b) Filgrastim : Thrombocytopenia due to myelocytic leukemia
(c) Iron dextran : Severe macrocytic anemia
(d) Ferrous sulfate : Microcytic anemia of pregnancy
(e) Folic acid : Hemochromatosis

7. Conversion of methionine to cysteine depends on vitamin

(a) B1 (b) B2
(c) B6 (d) B12

8. Avidin, a protein found in egg white is an antagonist of

(a) Biotin (b) Pantothenic acid
(c) Choline (d) Pyridoxal

9. All of the following are important functions of magnesium (Mg) except

(a) Nerve conduction
(b) Phospholipid synthesis
(c) Muscle contractility
(d) Carbohydrate, fat, and electrolyte metabolism

10. Factors likely to cause an increase in the blood urea nitrogen (BUN) level include

(a) Intramuscular (IM)injection of diazepam (Valium)
(b) Severe liver disease
(c) Chronic kidney disease

11. Physiologically carnitine plays following role

(a) Important for oxidation of fatty acids
(b) Decreases aerobic metabolism of carbohydrates
(c) Decreases rate of oxidative phosphorylation
(d) All of the above

12. Patients receiving iron therapy should be warned about

(a) Dizziness
(b) Ringing in the ears
(c) Danger of sunlight
(d) Blackening of the stool
(e) Paresthesia

13. Therapeutically vitamin B1 has been employed most successfully in the treatment of

(a) Microcytic anemia
(b) Pellagra
(c) Scurvy
(d) Beriberi
(e) Macrocytic anemia

14. Magnesium ion is necessary in

(a) Stimulating enzyme systems
(b) Muscular contraction
(c) Nerve conduction
(d) All of the above
(e) None of the above

15. The following derivatives of retinal shows the greatest biological potency than others

(a) 9-Cis-retinoic acid (b) All-trans-retinoic acid
(c) All-trans-retinol (d) 11-Cis-retinal

16. The drug used for controlling tetany is

(a) Intravenous diazepam
(b) Intramuscular vitamin D
(c) Intravenous calcium gluconate
(d) Intravenous calcitonin

17. Absorption of oral iron preparations can be facilitated by coadministering

(a) Antacids (b) Tetracyclines
(c) Phosphates (d) Ascorbic acid

18. The gut controls the entry of ingested iron in the body of

(a) Regulating the availability of apoferritin which acts as the carrier of iron across the mucosal cell
(b) Regulating the turnover of apoferritin-ferritin interconversion in the mucosal cell
(c) Complexing excess iron to form ferritin which remains stored in the mucosal cell and is shed off
(d) Regulating the number of transferring receptors on the mucosal cell

19. The percentage of elemental iron hydrated ferrous sulfate is

(a) 5% (b) 10%
(c) 20% (d) 33%

20. In isolated fibroblast or epithelial cells, retinoids enhance the synthesis of following protein

(a) Fibronectin
(b) Collagenase
(c) Certain species of keratin
(d) All of the above

21. The side effect which primarily limits acceptability of oral iron therapy is

(a) Epigastric pain and bowel upset
(b) Black stools
(c) Staining of teeth
(d) Metallic taste

22. Iron sorbitol-citric acid differs from iron dextran in that

(a) It cannot be injected i.v.
(b) It is not excreted in urine
(c) It is not bound to transferritin in plasma
(d) It produces fewer side effects

23. Which of the following is true about iron therapy ?

(a) Haemoglobin response to intramuscular iron is faster than with oral iron therapy
(b) Iron must be given orally except in pernicious anaemia
(c) Prophylactic iron therapy must be given during pregnancy

(d) Infants on breast feeding do not require medicinal iron

24. Concentrations of retinal in plasma in excess of _____ µg/dl usually are diagnostic of hypervitaminosis A

(a) 10 (b) 50
(c) 100 (d) 200

25. Megaloblastic anaemia occurs in

(a) Vitamin B_{12} but not folic acid deficiency
(b) Folic acid but not Vitamin B_{12} deficiency
(c) Either Vitamin B_{12} or folic acid deficiency
(d) Only combined Vitamin B_{12} + folic acid deficiency

26. The daily dietary requirement of Vitamin B_{12} by an adult is

(a) 1–3 µg (b) 50–100 µg
(c) 0.1–0.5 µg (d) 1–3 µg

27. Which of the following factor(s) is/are required for the absorption of Vitamin B_{12} ingested in physiological amounts ?

(a) Gastric acid
(b) Gastric intrinsic factor
(c) Transcobalamine
(d) Both (a) and (b)

28. Hydroxocobalamine differs from cyanocobalamine in that

(a) It is more protein bound and better retained
(b) It is beneficial in tobacco amblyopia
(c) It benefits haematological but not neurological manifestations of Vit B_{12} deficiencey
(d) Both (a) and (b)

29. Megaloblastic anemia is caused by deficiency of

(a) Iron (b) Vitamin B_{12}
(c) Vitamin C (d) All of the above

30. Vitamin B12 is a required co-factor for the following reaction

(a) Conversion of methylmalonyl-CoA to succinyl-CoA
(b) Conversion of 5-CH_3-H_4-folate to H_4-folate
(c) Conversion of homocysteine to methionine
(d) All of the above

31. Vitamin K is indicated for the treatment of bleeding occurring in patients

(a) Being treated with heparin
(b) Being treated with streptokinase
(c) Of obstructive jaundice
(d) Of peptic ulcer

32. Menadione (Vitamin K_3)

(a) Can cause hemolysis in patients with G-6-PD deficiency
(b) Is given in large doses in patients with severe liver disease
(c) Is useful to prevent haemorrhagic disease of the newborn
(d) Is the preparation of choice to antagonize the effect of warfarin overdose

33. Vitamin K promotes the hepatic biosynthesis of following blood clotting factor

(a) Factor I (b) Factor II
(c) Factor VIII (d) All of the above

34. folinic acid is principally used

(a) In pernicious anaemia
(b) In megaloblastic anaemia secondary to Vitamin B_{12}
(c) Along with methotrexate therapy
(d) In treatment of folic acid deficiency

35. Penicillamine

(a) Is effective orally
(b) Can cause anaphylactic reactions in patients allergic to penicillin
(c) Is safe in pregnancy
(d) Is not effective in lead poisoning

36. Succimer

(a) Can significantly mobilize essential metals
(b) Produces less toxicity than Dimercaprol
(c) Is ineffective orally
(d) Is contraindicated in children

Answer

1. c	2. a	3. a	4. c	5. a	6. d
7. c	8. a	9. b	10. c	11. a	12. d
13. d	14. d	15. c	16. c	17. d	18. c
19. c	20. a	21. a	22. a	23. c	24. c
25. c	26. a	27. d	28. d	29. b	30. d
31. c	32. a	33. b	34. c	35. a	36. b

EXPLANATIONS FOR THE ANSWERS

1. a Thiamine is vitamin B_1 and was the first member of vitamin B complex to be identified. Vitamin B_6 – Pyridoxine, pyridoxal and pyridoxamine. Medically used vitamin B_{12} is hydroxycobalamine. Vitamin B_2 is riboflavin

4. c In adults, approximately 1 mg of thiamine per dayis completely degraded by the tissues and 1mg is roughly the minimal daily requirement of thiamine.

7. c Conversion of methionine to cysteine depends on vitamin B6. Vitamin B1, B2 and B12 do not play any role in this conversion. Vitamin B6 is also involved in various metabolic transformations of amino acids e.g. decarboxylation, transamination and racemization.

8. a Avidin, a protein found in egg white, is an antagonist of biotin. Avidin is a glycoprotein and it binds with biotin with great affinity and thus prevents its absorption.

11. a Carnitine has several physiological roles:
- It is important for oxidation of fatty acids.
- It increases aerobic metabolism of carbohydrates.
- It increases rate of oxidative phosphorylation.
- It enhances the excretion of certain organic acids.

15. c Of all known derivatives of retinal, *all-trans*-retinol (and its aldehyde, retinal) has the greatest biological potency.

20. a In isolated fibroblasts and epithelial cells, retinoids enhance the synthesis of fibronectin and reduce the synthesis of collagen and certain species of keratin. These effects are mediated by change in the nuclear transcription.

Retinoic acid is more potent than retinal in mediating these effects.

24. c Concentrations of retinal in plasma in excess of 100µg/dl. usually are diagnostic of hypervitminosis A. Such hypervitaminosis is generally seen during the therapeutic use of retinoids in the treatment of skin disorders.

29. b Megaloblastic anemia is caused by deficiency of vitamin B12. It is characterized by macocytic anemia, mild to moderate leukopenia and/or thrombocytopenia, hypercellular bone marrow with megaloblastic maturation or erythroid and other precursor cells.

30. d Vitamin B12 is a cofactor for various biochemical reactions:
- Conversion of methylmalonyl CoA to succinyl CoA. This reaction requires deoxyadenosylcobolamin as a cofactor.
- Conversion of 5-methyl tetrahydrofolate to tetrahydro-olate and conversion of homocysteine to methionine. These two reactions use methylcobolamine as a cofactor.

33. b Vitamin K promotes the hepatic biosynthesis of factor II (prothrombin)and also factors VII, IX and X.

Vitamin K does not play important role in the biosynthesis of factors I and VIII.