**QUESTION BANK (VETERINARY PHARMACOLOGY)**

**PAPER No.22**

**Vitamins and minerals**

**I.Name the following:**

1.A cobalt containing vitamin .—(cyanocobalamin, B12)

2.A vitamin D2 analog.—(Dihydrotachysterol)

3. Disease in dogs caused by nicotinic acid deficiency .-(Black tongue)

4. Disease in humans caused by nicotinic acid deficiency.—(pellagra)

5.One natural preparation rich in vit. A.—( cod liver oil, halibut liver oil) 6.One lipid soluble form of vitamin B1. –( Allithiamine) 7.One ribose containing B complex vitamin –(riboflavin) 8.Other name for co-enzyme- R. –(vitamin H/ Biotin) 9.Other name for folic acid-(Ptroyl glutamic acid) 10.Other name for vitamin B10 .—(para amino benzoic acid) 11.Pellagra preventing vitamin.-(Nicotinic acid, Niacin) 12.Provitamin for vitamin D2 .—( ergosterol) 13.The anti sterility vitamin .-(Tocopherol/ Vit.E)

14. The most potent vitamin D3 metabolite.-(Calcitriol) 15.The most active form of vitamin E-( Alpha tocopherol ) 16.The most powerful reducing agent among vitamins .-(vitamin c, ascorbic acid) 17.The anti rachitic vitamin.-( vitamin D) 18.The coagulation vitamin.-(vitamin K) 19.The natural vitamin K found in plants.-( Phylloquinone) 20.The other name of Thiamine.-(Aneurine) 21.The synthetic vitamin K .-(menadione, K3) 22.The pellagra preventing vitamin.-(Nicotinic acid)

23.The vitamin associated with vitamin K which is responsible for prevention of gizzard ulceration in chicks .-(vitamin -U)

24.The B complex vitamin which is a constituent of para sympathetic transmitters.-(Choline)

25.The basic aluminium salt of sucrose octa sulphate that protect ulcerated site from acid bile and pepsin activity .—(sucralfate)

26.The most active form of Tocopherol.-( Alpha tocopherol) 27.The vitamin D obtained from ergosterol.-(calciferol/ D2) 28.The vitamin which is known as anti pernicious anaemia factor.-(Cyano cobalamine) 29.The vitamin ,deficiency of which causes yellow fat disease in horse.-( E)

30. The mineral present in glutathione peroxidise .—(Selenium)

 31.Two vitamin D analogues .-( paricalcitol, doxercalciferol)

**II. Fill up the blanks with most appropriate words:**

1.Absorption of calcium from the small intestine is a ..............vitamin dependent process.—(D)

2.A condition of the eye in poorly nourished slaves was first described in 1865 as ..................,later observed this as vitamin A deficiency.-(“ Opthalmia Brasiliana”)

3.Administration of ......................is the drug of choice for iron toxicity.---( desferrioxamine)

4.Alfa calcidiol is a synthetic derivative of vitamin......................—(D3)

5.Among iron salts .....................and ferrous fumerate is preferred for oral supplementation animal practice.—(ferrous sulphate)

6.Among iron dextran and iron sorbitol injection .............................is preferred for immediate requirement by the body. ---(iron sorbitol)

7.Androgens increases the erythropoiesis by promoting the secretion of…………………………….-(erythropoietin)

8.Ascorbic acid is synthesised by all animals except ..................and ..................—(primates and guinea pigs)

9.Biotin is otherwise called as co-enzyme..............-(R)

10.Biotin is otherwise called as vitamin.................-(H)

11.Brewers yeast is a rich source of *.................*vitamin .-(B1/ thiamine)

12.‘Brown mouth’ is a deficiency symptom seen in pigs due to deficiency of ..........(nicotinic acid

13.Citrus fruits are very good source of vitamin.....................-(C)

14.Copper sulphate and zinc sulphate orally can cause closure of ................. groove (oesophageal)

15.Cynocobalamine is otherwise known as .................anaemia factor.-(anti pernicious )

16.Cyanocobalamin is vitamin ...................( B12)

17.Dihydrotachysterol is an analogue of vitamin ........................—(D2)

18.Deficiency of ...................cause black tongue in dogs.-(Nicotinic acid)

19.Flavonoids are otherwise known as ..................................-( vitamin-P)

20........................................, a peptide hormone secreted by liver is the master regulator of iron metabolism in animal.—( hepcidin)

21.Iron deficiency results in characteristic microcytic ..................anaemia...—(hypochromic)

22.Irradiation of 7-dehydrocholesterol give ................................-( cholecalciferol / D3)

23.Magnesium aluminium monohydrate is known as ............................---(megaldrate)

24.Menadione is a ..............soluble vitamin.-(water)

25.Muscular dystrophy can be caused by the deficiency of ............vitamin.-(E)

 26...............................phenomenon prevent the absorption of excess iron from the intestine .---(Mucosal block )

27.Nicotinic acid directly acts on blood vessels and cause .......................-.(dilatation)

28.Normal calcium and phosphorus metabolism depend on .................vitamin.-(D)

29.One of the causes of Epistaxis is deficiency of ..........vitamin.-(K)

30.One international unit of vitamin A is equal to 0.3 micro gram ....................—(retinol) 31.Out of alpha, beta ,gama and delta tocopherol ...............is the most important one .—(alpha Tocopherol) 32.Pure vitamin A forms include two retinoids ...........................and ....................—( retinol, 3-dehydroxy retinol) 33.Perosis is a disease caused by deficiency of ........................., a B complex vitamin.-( choline) 34.Scurvy is a deficiency disease of ............vitamin.-(C) 35.Selenium enhance the action of vitamin E.—(E) 36.Spoiled sweet clover causes vitamin ...........deficiency.-(K) 37.The most important function of vitamin B1 is acting as a ..................for carbohydrate metabolism-(Co-enzyme) 38.The true form of B12 is .................................and not cyanocobalamin.-( hydroxyl cobalamin) 39.The main function of vitamin K is synthesis of .............................-(prothrombin) 40.The main cause of Beriberi is the deficiency of ..........................-(thiamine) 41.Thiamine (B1) is otherwise called as ........................-(Aneurine) 42.Vitamin D3 is synthesized in the skin from ......................by the ................—( 7-dehydrocholesterol, sunlight) 43.Vitamin ................is used as reference standard for assay of antirachitic compound.—(D3)

44.Vitamin B1 is otherwise known as .......................-(Thiamine) 45.Vitamin ....................is a fat soluble one having powerful antioxidant action.-(E) 46.Vitamin K is an antidote for ..........................poisoning.-(coumarin/warfarin/ sweet clover) 47.Vitamin D2 is otherwise known as ..............-( calciferol) 48.Vitamin E is otherwise called as ..................................—( alpha tocopherol) 49.Vitamin E is available in 4 forms namely ............, ........., .............and.............-( alpha, beta , gama, delta)

50.White muscle disease is the deficiency of vitamin ...................-(E) 51.Wheat germ oil is a rich source of vitamin ..................-(E) 52................................ present in raw egg white inactivate biotin.-(avidin) 53............................B vitamins are yellow or yellow orange in colour .—(Riboflavin) 54...............................vitamin is called as natural anti histamine.—(C)

55. In poultry the requirement of vitamin D is expressed in international ...........................units. ( chick )

56. Salbutiamine is a synthetic derivative of ....................vitamin.( thiamine)

57.Homeostasis of calcium is mainly regulated by ........................., calcium and vitamin-D.( parathormone)

58. In the treatment of hypocalcaemia , calcium chloride is less preferred than other calcium salts because calcium chloride is .........................( more irritant)

59.Magnesium sulphate should be used with caution in patients with impaired ......................function.—( renal )

**III. Write true or false:**

1.About 50% of the body magnesium exists in insoluble form in bones.---(T)

2. Aluminium hydroxide is a systemic antacid .---(F)

3. Alfacalcidol does not require renal hydroxylation to convert in to active form . –(T)

4. Animals can not synthesise vitamins in their body. —(F)

5. Bexartene is a third generation retinoids .—(T)

6. Bile salt is necessary for the good absorption of cholecalciferol from the intestine.(T)

7. Biotin is a sulphur containing organic acid. –(T)

8. Bismuth along with metronidazole or amoxicillin is used to eradicate *Helicobacter pylori*.—(T)

9. Carnitine is having antioxidant action. –(T)

10. Calcifediol is the active form of vitamin D.—(F)

11. Calcitriol is about 10 times more potent than cholecalciferol.—(T)

12. Calcium carbonate should not be given along with milk because it may produce ‘milk alkali syndrome’.—(T)

13. Cats are unable to convert beta carotene to vitamine A. —(T)

14. Cobalt deficiency affect more severely in cattle than sheep.—(F)

15. Cobalt salts are more effective by parenteral route than oral in ruminants.—(F)

16. Cod liver oil is a good source of vitamin.A.-(T)

17.Convertion of calcifediol to calcitriol takes place in the kidney.—(T)

18.Copper and copper containing compounds suppress inflammatory reactions.—(T)

19.Copper preparation based on methionine and heptonate complexes are used in depot preparation .—(T)

20.Copper preparations can be recommended in patients with kidney disease.—(F)

21.Copper, zinc, cobalt and selenium are immunostimulant minerals.—(T)

22.Domestic animals does not require dietary vitamin C .—(T)

23.Dietary sulphate , iron and molybdenum will inhibit oral absorption of copper .—(T)

24.Domestic animals does not require vitamin C .--(F)

25.Egg and milk in diet will reduce the availability of iron orally .—(T)

26.Iron chelate with penicillamine .—(T)

27.For absorption of menadion from the G.I.tract bile is essential.—(F)

28. Haemosiderin is a storage form of iron.—(T)

29. Horse can convert carotene to vitamin A very easily .—(F)

30. Hyper vitaminosis A causes rapture of lysosome.-(T)

31. Inositol deficiency cause alopecia.-(T)

32. Inositol is otherwise called as mouse anti alopecia factor.—(T)

33. In chicks riboflavin deficiency can cause curled toe paralysis .-(T)

34. Iron is mainly absorbed from the ileum.—(F)

35. Iron is contra-indicated in patients with haemolytic anaemia.—(T)

36. Magnesium antacids are contraindicated in renal disease.—(T)

37. Magnesium hydroxide release carbondioxide and hence rebound acidity is seen.—(F)

38. Magnesium trisilicate react with gastric content to give gelatinous silicon dioxide which protects the ulcerated mucosal surface.—(T)

39. Magnesium ions will be well absorbed from the gut .—(F)

40.Magnesium salts are laxative and aluminium salts are constipatory in effect.---(T)

41.Menadione is Vit. K3 .—(T)

42.Magnesium hydroxide is fast acting and aluminium hydroxide is slow acting antacid.—(T)

43.Non ruminants do not require cobalt in their diet.—(T)

44.Non ruminants require pre-formed vitamin B12.—(T)

45.Nutritional roup in birds is a disease caused by vitamin A deficiency.-(T)

46.Omeprazole block the absorption of vitamin B12 from the G.I.tract.—(T)

47.One gram of aluminium hydroxide neutralise about 5 . 2 mEq. of HCl.---(F)

48.One of the commercial source of vitamin B12 is by-product of streptomycin manufacture.-(T)

49.Peanut oil is a good source of vitamin –(E)

50.Pramlintide is an analogue of amylin.-(T)

51.Presence of ascorbic acid in the diet increases the iron absorption.—(T)

52.Prolonged administration of liquid paraffin as a laxative can cause A vitaminosis- .(T) 53.Pyridoxine is one of the most stable B complex vitamin.-(T) 54.Pantothenic acid act as co-enzyme for acetyl transferase enzyme.-(T) 55. Pyridoxine is an antidote to cyanacet hydrazide.-(T)

56.Rebamipide is an aminoacid derivative of quinolinone.-(T)

57.Riboflavin is acting as co-enzymes for a variety of respiratory proteins.-(T)

58.Selenium is a component of glutathione peroxidase which is an antioxidant enzyme.—(T)

59.Selenium is contraindicated with Dimercaprol.—(T)

60.Scurvy was first reported by British sailors.-(T)

61.Sucralfate and antacids are contraindicated .—(T) 62.Synthetic vitamin E, tocofersolan is water soluble .—(T)

63.Sulphur is having keratolytic and antiseborrhoeic action.—(T)

64. Teratogenicity may occur with all synthetic retinoids there for they are contra indicated in pregnancy.—(T)

65.The excess iron in ferritin (storage iron) is lost in to the lumen of gut and excreted in faeces.—(T)

66. The metabolite of vitamin D3 by the kidney 1,25(OH)2 D3 is the most potent vitamin D metabolite.—(T)

67. The commercial source of vitamin B12 is from *Streptomyces griseus.*—(T)

68.Thiamine acts as a co-enzyme in carbohydrate metabolism.-(T)

69.Third generation retinoid, Bexarotene is primarily indicated for the treatment of cutaneous T cell lymphomas.—(T)

70.The haemostasis of phosphorus is controlled by vitamin D and calcium.—(T)

71.Trans cobalamins are the trans form of vitamin B12 .—(F)

72.Trans cobalamin is a specific protein which transport vitamin B12 .—(T)

73.Tretinoin is a first generation retinoids.—(T)

74.Tretinoin (vit-A) is a potent comedolytic agent .—(T)

75.Vitamin C is essential for maintaining SH activity of enzyme system.-(T)

76.Vitamin D analogs can be used in excess parathyroid secretion.-(T)

77.Vitamin D and its analogs stimulate the synthesis of calcium binding protein.-(T)

78.Vitamin D3 have lower bioavailability than D2 .—(F)

79.Vitamin D2 has only one fifth of the activity of D3 in avian species .—(T)

80.Vitamin D2 and D3 are equally active in mammalian species.—(T)

81.Vitamin K1 is absorbed by an energy dependent active transport mechanism, whereas vit. K2 by simple diffusion .—(T)

82.Vitamin K3 is the natural vitamin K obtained from plants.-(F)

83.Vitamin K is well stored in liver tissue.-(F)

84.Vitamin A is widespread in nature as alpha and gama carotene.-(T)

85.Vitamin A and carotene are absorbed from G.I tract only when adequate fat is available.- (T)

86.Vitamin A is necessary for the synthesis of corticosteroids.-(T)

87.Vitamin A is more actively involved in the visual cycle in Rod cells .—(T)

88.Vitamin A stabilize the lysosomal membrane.-(T) 89.Vitamin A is a part of visual purple or rhodopsin .-(T)

90.Vitamin A2 is 3 times more active than vit. A1- -(F)

91.Vitamin A and D can be harmful when overdosed.—(T)

92.Vitamin B2 , Riboflavin is otherwise known as vitamin G.-(T)

93.Vitamin D is otherwise known as antirachitic vitamin.-(T)

94.Vitamin D3 is otherwise known as cholecalciferol.-(T)

95.In hypocalcaemia calcium chloride will act faster than calcium gluconate. –(T)

96.In hypocalcaemia calcium chloride injection may cause sloughing of injection site and cardiotoxicity.—(T)

97.Fifty percent of the total body magnesium is intracellular .-( F)

98.About 50% of the total body magnesium exists in insoluble state in bones.-(T)

99. Acute hypomagnesaemia is associated with CNS hyperirritability and tetanic convulsion .-(T)

100.Twenty percent magnesium sulphate can be administered intravenously in hypomagnesaemia.(T)

101.Acute phosphorus deficiency in lactating cow can cause post parturient haemoglobinuria.-(T)

102.Presence of boric acid will increase the solubility of calcium gluconate in water.—(T)

**IV. Choose the correct answers from the given ones:**

1.Ascorbic acid is synthesised by the following species in their body a) human b) cattle c) monkey d) none .-( b )

2.Calcium is essential for a) the growth of bone and teeth b) clotting of blood c) for neuromuscular activity d) for metabolic activity e) all the above are correct.----(e)

3.Cobalt is necessary to a) enhances the synthesis of vitamin B12 by rumen microflora.

b) enhances the production of erythropoietin by the kidney c) facilitate the incorporation of iron in to haem. d) all the above.—(d)

4.Deficiency of tocopherol can cause a) white muscle disease in cattle b) encephalomalacia in chicks c) yellow fat disease in pigs d) degenerative myeloencephalopathy in horse e) all are correct.—(e)

5.Elevated serum calcium level may occur due to a) hyperthyroidism b) hypoadrenocortism c) vit. D intoxication e) chronic renal disease f) all the above cases.---(f)

6.For long term therapy with calcium one of the following is preferred a) calcium gluconate intra venous b) calcium gluconate intra peritoneal c) increase dietary calcium and vitamin- D —(c)

7.Hypocalcaemia in cattle can cause a) short period of excitement b) muscle tremors c) stiff gait d) muscular weakness e) all the above.---( e)

8.In the body iron is seen in a) haemoglobin b) myoglobin c) transferring d) ferritin e) all the above .—( e)

9.One of the following is a synthetic analogue of vitamin D . a)ergosterol b) cholecalciferol c) calcitriol d) calcifediol e) none of the above .—(e)

10.Some of the following are iodide trapping inhibitors. a) perchlorate b) thiocynate c) fluoborate d) all the above.—( d)

11.Vitamin D is essential for a) phosphorus metabolism b) causes more permeability of intestinal mucosa to calcium c) to get full effect of para thormone d) all the above.-(d)

12.Vitamin D3 and its metabolites stimulate serum calcium and phosphorus level by a) stimulate calcium and phosphorus absorption from the gut. b) stimulate calcium and phosphorus reabsorption from the renal tubules. c) stimulate bone resorption. d) all the above.—(d)

13.Vitamin E a) is an antioxidant in action b) potentiate the immune system of the body c) present in germinating cereals d) is a fat soluble vitamin e) all are correct.—(e)

14.Hypercalcaemia in dogs may occur due to a) hyperparathyroidism b) hypoadrenocortism c) vitamin D intoxication d) chronic renal disease e) all the above.—( e )

15.Adverse effects related to magnesium sulphate overdose are a) neuromuscular blocking activity b) muscular weakness c) respiratory depression d) cardiac depression e)all the above. –( e )

**V.Answer the following:**

1. This vitamin will act as a Co-enzyme for carboxylation reaction. which vitamin?----(Biotin)

2.What are the symptoms of hyper vitaminosis A? Early signs of intoxications are irritability, itching, loss of appetite, fatigue, myalgia, loss of hair, gingivitis, hepatomegaly, lysosomal rapture, subcutaneous swelling , excessive growth of bones, dry skin.

3.What is the mechanism of action of Erythropoietin? Erythropoietin activate erythropoietin receptors and stimulate the janus kinase cascade similar to growth hormone signalling and finally stimulate erythropoisis.

 4.What are the symptoms of vitamin A deficiency? Causes night blindness, scaliness of skin, keratinisation of skin, cornea, chronic ulcerative colitis, reduce growth and fertility, blindness in calves, nutritional roup in birds.

5. What are the clinical signs of hypocalcaemia in cattle? Characterised by an initial short period of excitement , muscle tremors and stiff gait followed by muscular weakness , sternal recumbency.

6.Why aluminium hydroxide is often mixed with magnesium salts to reduce the side effect of aluminium salts. Which side effect ? Aluminium salts can cause constipation due to its smooth muscle relaxant and mucosal astringent action. Magnesium hydroxide is laxative – both actions neutralise each other result in neither constipation nor laxative.

7.What are the functions of fat soluble vitamins? -- broad range of functions such as enzymatic cofactor--- signal transduction mediators and antioxidants.

**VI.WRITE SHORT NOTES ON:**

1. Antirachitic vitamin.: Vitamin D ( D1-D5) group of fat soluble seco-steroids . produced in animals by UV irradiation of respective sterols. Absorbed well orally from food- mechanism of action resembles that of steroids and thyroid hormones. Necessary for proper utilisation of calcium and phosphorus- maturation and differentiation of mononuclear cells and influence cytokine production. Deficiency cause rickets, osteomalacia. Excess in diet cause hyper calcaemia and calcification of soft tissues ( blood vessels of lungs, kidney and heart). Vitamin D3 is widely used in the treatment of hypoparathyroidism- rickets and osteomalacia- to prevent hypocalcaemia (milk fever).

2. Functions of vitamin A in the body? involve in vision especially night vision, maintain normal structure and function of epithelial cells , promote mucus secretion and inhibits keratinisation of epithelial cells . It can influence the expression of receptors for certain hormones and growth factors and thus can influence the growth, required for proper antibody response , normal lymphocytic proliferation and killer cell function, needed for the maintenance of spermatogenesis and foetal development , involved in growth and cell differentiation , important role in carbohydrate, fat and protein metabolism.

3. Milk alkali syndrome ? When milk is administered with calcium carbonate milk alkali syndrome is seen, characterised by abdominal discomfort , anorexia, weakness and abdominal calcium deposits. The syndrome results from excess calcium and absorbable alkali which cause hyper calcaemia, reduce secretion of parathormone, retention of phosphate , precipitation of calcium salts in the kidney and renal insufficiency.

4. Koagulation vitamin : (vitamin K) it is a group of naphthoquine compounds required for the biosynthesis of several clotting factors. Occurs in nature as K1 and K2 ( phytomenadione and menaquinones) K1 is absorbed by active transport and K2 is by simple diffusion. Absorbed from intestine via lymph- require fat and bile for absorption- temporarily stored in liver- metabolised rapidly . deficiency is rare in animals because of its presence in most plants. Synthesised by microbs in intestine- used for prophylaxis and treatment of bleeding disorders. Menadione ( synthetic form of K ) is absorbed orally.

5. Pharmacology of Cyanocobalamin: it is a cobalt containing vitamin-dark red crystals- hygroscopic- soluble in water- one of the members of B complex vitamin (B 12) . It is synthesised in nature only by microbs- in most species essential as a supplement. Commercial source is *streptomyces griseus* as a bye product of streptomycin industry. Available as oral, parenteral preparations. Orally interact with a large number of drugs. Well absorbed orally –intravenous is not advisable. Indicated in pernicious anaemia. Ruminants synthesise it in the rumen by microbs if sufficient cobalt is available in the ration.

6. Role of vitamin D in the body: involved in the maintenance of normal level of calcium and phosphorus in the blood , enhances the intestinal absorption , bone resorption and bone deposition of calcium and phosphorus - enhances proximal tubules resorption of the same in kidney - important for normal insulin secretion - affects maturation and differentiation of mononuclear cells and influence cytokin production.

7. Aneurine (thiamine) : first member of the vitamin B complex –occur naturally in plants , meat, fish, egg etc. Ruminants does not require dietary source since rumen microbs synthesise it- very rarely only deficiency occur. It has important roles in the carbohydrate metabolism, facilitate transformation of ketols, involved in sodium gating process. Deficiency results in ‘beriberi’ in human beings, characterised by polyneuritis, cardio vascular symptoms, gastro intestinal disorders. In animals presence of thiaminase in the diet -( eg.bracken fern poisoning ) cause thiamine deficiency. Treatment- administer thiamine orally / parenterally.

COURTESY

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