1. Give the food sources of vitamin A

Free retinol is not generally found in food. Retinyl palmitate is a precursor and is the major storage form of retinol which is exclusively found in foods of animal origin. Yellow, orange and green coloured vegetables and fruits contains significant quantities of Vitamin A. Cod liver oil, eggs, butter, milk, sweet potato, carrot, papaya, mango, spinach and broccoli are considered as the good sources.

2. What are the major symptoms of vitamin A toxicity.

The major symptoms include head ache, drowsiness, nausea, loss of hair, dry skin, diarrhea, resorption of bone are the major problems encountered among adults. Among infants it results in scaly dermatitis, loss of weight, anorexia, hyper irritability and skeletal pain. These symptoms are observed when the dose exceeds more than 8000 RE/day which when taken for more than 30 days.

3. Give the RDA for vitamin A

ICMR has recommended an intake of 4800 µg β-carotene for both adult man and woman. During pregnancy extra allowances are needed to support fetal growth and are estimated to be about 6400µg. During lactation it is 7600µg. For children between the age group of 1-6 years and 7-9 years it is suggested to consume about 3200µg and 4800µg/day of β-carotene.

4. Write a note on the discovery of vitamin A.

It was discovered in 1909 by Mccullum and Davis. Vitamin A is required for the maintenance of normal vision. Retinol as well as retinal can be inter converted. Other most important compounds of vitamin A family are retinyl esters and β- carotene. Carotenoids are the major precursors of vitamin A and are structurally associated with β-carotene.

5. Role of vitamin A in maintaining immunity

It is also known as anti infective vitamin. The skin and mucosal cells which line the digestive and urinary tract functions as a barrier to form body's first line of defense against infection. Retinol and its metabolites are much needed for maintaining the integrity and function of those cell lines.

6. History of vitamin D discovery

It was discovered by Sir Edward mellanby in 1918 who identified the antirachitic properties of vitamin D. this vitamin exists in two forms; vitamin D3 also known as cholecalciferol which is found in foods of animal origin. The other form is vitamin D2 referred to as ergocalciferol and is widely distributed among plant substances. Available scientific evidences have suggested that exposing hand and face for about 15 minutes a day for at least three times a week is considered to be sufficient to synthesize vitamin D in the body.

7. Highlight the importance of vitamin D

The most important metabolite of vitamin D which has physiological significance is 1, 25-dihydroxy vitamin D. It has the ability to enhance the level of calcium binding protein in the small intestine thus helps in the absorption of dietary calcium and phosphorus. Mobilization of calcium and phosphorus in association with parathyroid hormone occurs in the bone due to vitamin D.

8. What are the major sources of vitamin D

Vitamin D is naturally synthesized by exposing the skin to sun light. Most foods have negligible amounts of vitamin D. marine fishes are the good source. Egg yolk and butter milk are the poor sources. Cod liver oil is one of the richest sources having the highest concentration of 100000 IU/100g.

9. What are the major food sources of vitamin E

Vitamin E is synthesized only by plants and hence is primarily found only in plant based foods. Thus fats and oils of vegetable origin are known to be the richest sources of vitamin E. vegetable oils and oils derived from food grains have been estimated to contain about 50-100mg per 100g of the product. Only 8mg is present in coconut oil. Wheat germ oil is exclusively the rich source of vitamin e containing about 260mg/100g. The chief sources in Indian diets are the vegetable oils, nuts, oil seeds and whole grains. Significant amount of tocotrienols are found in palm oil, rice bran oil and the bran and germ portions of certain cereals like oats, barley and rice.

10. Explain in brief the role of vitamin E as an antioxidant

Due to its antioxidant property vitamin E protects key cell components by neutralizing free radicals before they can cause lipid oxidation or DNA damage. By reducing free radical attack, antioxidants help to break the chain reaction of lipid peroxidation (chain-breaking antioxidant) and they protect the cell membranes by facilitating the processes of lipid repair and lipid replacement. Through this mechanism they may prevent cancer or heart disease or any other form of degenerative disorders. A high plasma concentration of vitamin E is associated with lower risk of cardiovascular disease.

11. What are the manifestations of vitamin E deficiency

Vitamin E deficiency is rarely encountered in humans. Vitamin E deficiency may occur only as a result of certain genetic conditions such as abnormalities occurring in α- tocopherol transfer protein, fat malabsorption syndromes or in severe protein energy malnutrition. Insufficient dietary intake of the vitamin is the common cause of deficiency.

The deficiency symptom is primarily manifested as peripheral neuropathy which is characterized by the degeneration of the axons in the sensory neurons. Other manifestations in humans include spinocerebellar ataxia, skeletal myopathy, pigmented retinopathy, increased erythrocyte fragility

and increased production of ethane and pentane.

12. Write a note on the requirement of vitamin E

Requirement is limited to essential fatty acids. Alpha tocopherol requirement is related to its major role in protecting antioxidant property of essential fatty acid content in the diet and the suggested intake is 0.8 mg per g of EFA. This roughly contributes about 8-10 mg tocopherol /d, depending on the type of edible oil used. Vegetable oils and invisible fat from cereals and other foods like nuts and vegetables contributes adequate tocopherol in Indian diets.

13. Write in brief the discovery of vitamin K

This vitamin was discovered in 1934 by a Danish scientist Dam. He explored the fact that bleeding in chickens could be prevented by feeding decayed fish meal. Vitamin K is also referred to as coagulation vitamin, antihemorrhagic vitamin and prothrombin factor. Vitamin K is highly indispensable for maintaining normal blood coagulation system in both humans as well as other experimental animals.

14. Write short notes on the various forms of vitamin K

In general it exists in two forms in nature. Vitamin K1 is widely distributed among plant kingdom and is termed as phylloquinone. The other form is K2 which was isolated from putrid fish and is called as menaquinone. The last form is K3 known as menadione and it is of purely synthetic form. This vitamin can be synthesized by intestinal flora. It is considered as one of the most important nutrient during infancy because intestinal synthesis is insufficient and it needs to be provided externally.

15. Important food sources of vitamin K

Vitamin K is widely distributed in plant foods. Green vegetables are known to contain highest concentration. Dark green leafy vegetables such as kale, parsley and spinach would have been estimated to contain about 300-600µg/100g. Broccoli, Brussels sprouts and lettuce are the intermediary sources having about 100-200µg/100g. non leafy vegetables such as green beans, cauliflower and cucumber are also considered as significant sources which contains on an average 20-50µg/100g