**FTNM13: FUNCTIONAL FOODS AND NUTRACEUTICALS**

**THEORY**

**Unit -1:** Definition, status of functional foods in world and India. Classes of nutraceuticals and functional foods. Regulatory issues for nutraceuticals including CODEX

**Questions:**

1. Define functional food. (2)
2. What is neutraceuticals?(2)
3. Discuss status of functional foods market in India and in world. (3+3)
4. Which country ranks 1st in functional foods market? (1)
5. What are the differences between functional foods and nutraceuticals? (2)
6. Classify functional foods and nutraceuticals (3+3)
7. Write advantages and disadvantages of neutraceuticals.(2)
8. Write regulatory issues for functional foods and nutraceuticals (2+2)
9. What is novel food?(2)
10. What is the regulation of novel food?(2)

**Unit -2:** Dietary and therapeutic significance of dairy nutrients, bioactive components in dairy products like lactose, whey proteins, milk minerals, CLA, biactive peptides, fermented milks etc.

**Questions:**

1. What is milk bioactive peptide. Write its role in human health. (1+5)
2. What is CLA. Write its role in human health. (1+3)
3. Write importance of different bioactive whey proteins. 5
4. Write importance of lactulose and lactitol. (1.5+1.5)
5. Discuss role of calcium in human body. (3)
6. Write therapeutic significance of fermented milk. (3)

**Unit –3:** Food fortification, techniques for fortifying dairy foods with minerals and vitamins, protein, dietary fibers.

**Questions:**

1. Write down technologies to fortify minerals and vitamin in dairy products. (4+4)
2. Discuss on protein fortification in dairy products. (4)
3. What are the dietary fiber that can be add in dairy foods. (5)

**Unit – 4:** Dietary formulation of infant and geriatric food.

**Questions:**

1. What are dietary requirement for various infant age group. Write down role of water for infant nutrition. (2+3)
2. What are the current market scenario for infant food product. Write role of carbohydrate and protein and fat in infant diet.(2+6)
3. Why geriatric nutrition is important for older?(2)
4. What foods are necessary for geriatric?(4)
5. Write down Dietary pattern for older adults.(6)

**Unit –5:** Technological aspects of reduced calorie foods, alternatives for calorie reduction, low calorie sweeteners, bulking agents and their application, fat replacers

**Questions:**

1. Write short notes on following artificial sweeteners- Acesulfame potassium, Aspartame, Saccharin, Sucralose, Stevia, Sugar Alcohols or Polyols, Erythritol, Hydrogenated starch hydrolysates, Isomalt, Lactitol, Maltitol, Mannitol, Sorbitol, Xylitol, Tagatose, Trehalose (2.5)
2. What are bulking agents? Write its importance (2+2)
3. What is fat replacer? Differentiate between fat substitute and fat mimetics. Write different types of fat replacers (1+3+5)

**Unit –6:** Nutritional and health significance of sodium in foods, Alternatives for sodium in foods, techniques for reducing sodium in processed dairy foods.

**Questions:**

1. Write nutritional significance of sodium in foods. (3)
2. What approaches we can adopt to minimize salt content in processed dairy foods? (3)

**Unit – 7:** Sports foods, ingredients for sports foods, sports drinks, design consideration, ergogenic aids in sports nutrition.

**Questions:**

1. Define sports food. (2)
2. Write benefits of sports food to a sports person (3)
3. Discuss in detail about the ingredients of sports foods. (4)
4. Classify sports foods. (3)
5. What is carbohydrate loading? (2)
6. What is Heat cramps/Muscle cramps? Write its reason and tips to avoid it. (1+2+2)
7. Define sports drink. Classify sports drink. (1+3)
8. Write a short note on – ergogenic aids in sports nutrition (3)

**Unit –8:** Herbs, various classes of herbs, their therapeutic potential and application in foods. Bio-flavours.

**Questions:**

1. What is herbs? (2)
2. Write therapeutic potential and food application of the following herbs - Ashwagandha, Turmeric, Arjuna, Sage, Cinnamon, Cumin, Garlic, Fenugreek, Pappermint, Basil, Aloe vera (2)
3. Write need for bioproduction of flavour compounds. (2)
4. Write responsible flavor compound and microorganism for - buttery attributes in cultured dairy products, nutty and roasted flavor, potato-like flavor, mint flavor, citrus flavor, bitter almond and cherry flavor, vanilla flavor (2)

**Unit – 9:** Probiotics, Prebiotic substances and their utilization in functional foods, symbiotic foods.

**Questions:**

1. What is probiotic, prebiotic and symbiotic/synbiotic? (3)
2. Write name of two probiotic bacteria. (1)
3. Write example of two prebiotic substances. (1)
4. Write applications of probiotics in different food products. (3)
5. Write health benefits of probiotic bacteria. (4)

**Unit – 10:** Definition and various classes of phytochemicals, their role in CVD, Cancer and immune system enhancer, utilization in functional foods, phytoestrogens, glucosinolates, lycopene, isoflavonoids, glucosamine, organosulphur compounds, flavonoids, chatchins, tannins carotenoids, phytoestrogens, phytosterols, pigments (lycopene, carcumin) etc.

**Questions:**

1. Define phytochemicals. (1)
2. Write therapeutic role of phytoestrogens, glucosinolates, lycopene, isoflavonoids, glucosamine, organosulphur compounds, flavonoids, chatchins, tannins carotenoids, phytoestrogens, phytosterols, pigments (lycopene, carcumin) (2.5 for each)
3. Write Promising Functional Foods with Phytochemicals (3)

**Unit – 11:** Phytatics, Protease inhibitors, amalysae inhibitors, Heamagglutinins, Saponins. Non nutrient effect of PUFA and MUFA.

**Questions:**

1. Write down difference among LDL,HDL,VLDL.(4)
2. What is CVD?Write down types of CVD.(2+4)
3. Difference Between normal Cell growth And cancer cell growth.(4)
4. What is IBD .Write Down Symptoms Of IBD.(2+3)
5. Symptoms And Types of age related macular degeneration.(2+3)
6. Write down functional food and netraceuticals for management of CVD,IBD,Diabets, obesity, joint pain, age-related macular degeneration, endurance performance.
7. What is Milk Allergy.What is Lactose Intolerance.Difference Between Milk Allergy And Lactose intolerance.Symptoms of lactose intolerance.
8. What is milk imitation?

**Unit – 12:** Functional foods and nutraceuticals for management of cholesterol, IBD, diabetics, obesity, joint pain, age-related macular degeneration, endurance performance, milk allergy and lactose intolerance.

**Questions:**

1. Write down difference among LDL,HDL,VLDL.(4)
2. What is CVD?Write down types of CVD.(2+4)
3. Difference Between normal Cell growth And cancer cell growth.(4)
4. What is IBD .Write Down Symptoms Of IBD.(2+3)
5. Symptoms And Types of age related macular degeneration.(2+3)
6. Write down functional food and netraceuticals for management of CVD,IBD,Diabets, obesity, joint pain, age-related macular degeneration, endurance performance.
7. What is Milk Allergy.What is Lactose Intolerance.Difference Between Milk Allergy And Lactose intolerance.Symptoms of lactose intolerance.
8. What is milk imitation?

**Unit – 13:**Nutrients as gene modulators: Its effect on puberty, reproduction, Polycystic Ovary and nutritional management. Mechanism of action of Xenoestrogen, Food sources of xenoestrogen,

**Questions:**

1. What is PCOS?(2)
2. What is PCOD?(2)
3. Difference between PCOD &PCOS.(3)
4. What type functional food effects on early age puberty?(4)
5. What is xenoestrogen?(2)
6. Write down types Epigenetics.(3)
7. Write down application Nutrigenomics.(2)
8. What is the mechanism action of xenoestrogen?(4)

**Unit – 14:** Foodomics, nutrigenomics, nutrimetabolomics, epigenetics and nutriproteomics

**Questions:**

1. What is fodomics and its application?(2+2)
2. What is nutrimetabolomicsand its application?(2+2)
3. What is nutriproteomicsand its application?(2+2)

**Unit – 15:** Food Nanotechnology: Functionality and applicability of food nanotechnology, Nanocarrier systems for delivery of nutrients and supplements, Nanocoatings on food contact surfaces, Safety concerns

**Questions:**

1. What is nano coating and How it is apply on food contact surface .(2+4)
2. What is nanocarrier system ?(2)
3. Application of nano technology in food industry.(8)
4. What are safety concern of nano coating?(4)

**PRACTICAL**

* 1. Determination of crude, dietary and total fiber in foods
  2. Manufacture of fiber enriched milk beverage
  3. Manufacture of low calorie burfi/ice cream
  4. Preparation of flavoured milk using artificial sweetener
  5. Determination of antioxidant activity of food/food components
  6. Determination of bioavailability of nutrients

1. Development of malted milk food and weaning food
2. Determination of β-galactosidase activity and application of lactases for lactose free dairy products
3. Determination of prebiotic potential of certain plant/milk components and their application in synbiotics dairy foods
4. Preparation of sports beverage, herbal dairy drinks
5. Preparation of high protein products
6. Identification and estimation of lycopene
7. Identification and estimation of carotene
8. Determination of total antioxidant capacity of selected nutraceuticals
9. Determination of gamma oryzanol content in rice bran oil
10. Determination of tocopherol content in rice bran oil
11. Determination of tannin content, ascorbic acid content in amla juice
12. Development of protein enriched biscuits as a functional food
13. Production of functional food for diabetic patient
14. Determination of dietary fibre content in selected functional food
15. Preparation of symbiotic yoghurt/ dahi and its sensory and microbiological evaluation
16. Production of flavonoid rich food product and evaluation of flavonoid content in it
17. Production of carotenoids from pumpkin powder
18. Production of ginger and turmeric oleoresins and their used in food products
19. Development of labels for health foods
20. Visit to Functional food/ Nutraceuticals manufacturing industry