SEMESTER – 2

COURSE CODE: BPVC-102

COURSE TITLE: FOOD CHEMISTRY AND NUTRITION

Attempt both parts of the assignment. **Maximum Marks: 100**

PART – A: ASSIGNMENTS

Attempt all questions. All questions carry equal marks. Write your answers in about 500 words. **Marks: 5x10=50**

1. Explain the scope and functions of food chemistry, and relate its contributions to food quality, safety, nutrition, processing and waste management. 10
2. Discuss the classification, functions and food sources of vitamins and minerals. Analyze the effects of food processing on their stability. 10
3. Explain the importance of good nutrition, dietary allowances and balanced diets, and discuss their significance for different age groups. 10
4. Discuss the nutritive value of agricultural produce, compare their major nutrients, and identify factors that influence nutritional quality. 10
5. Classify food additives according to their functions and critically analyze their benefits, potential risks and regulatory considerations. For a given food product (select any one processed food product), recommend suitable additives based on its intended function and safety requirements. 10

PART – B: ACTIVITIES

Perform all activities. Submit the evidence (activities notebook, charts etc.) of any FIVE Activities. For details, kindly refer to Block 5 Activities Manual. **Marks: 5x10=50**

Activity 1: To observe the changes during dry heating of sugar.

Activity 2: To identify and categorize the preservatives used in beverages, pickles, baked and canned products.

Activity 3: To boil eggs and observe the changes in the physical state.

Activity 4: To observe the changes in colour, texture and odour of roasted and unroasted semolina and gram flour.

Activity 5: To study the rancidity of oils.

Activity 6: To prepare a collage of Vitamin A rich foods.

Activity 7: To prepare a chart depicting the inter-relationship between the metabolism of carbohydrates, lipids, and proteins.

Activity 8: To prepare curd and learn the science behind it.

NOTE:

For the assignment questions of other generic courses you have opted for in the 2nd Semester i.e. **Minor Vocational Course, Ability Enhancement Course (AEC) and Value-Added Course**, kindly download them (search course codes in the format e.g. BCOS-185, select the correct session and download them) from the assignment section of the IGNOU website (https://www.ignou.ac.in/studentService/download/assignments).

1. Explain the scope and functions of food chemistry, and relate its contributions to food quality, safety, nutrition, processing and waste management. 10

Answer

Food chemistry is the study of the chemical composition of food and the changes that take place during harvesting, storage, preparation, processing and digestion. It connects chemistry with nutrition, food technology, microbiology and health. A food chemist studies major constituents such as water, carbohydrates, proteins and fats, along with vitamins, minerals, pigments, enzymes, flavour substances and naturally occurring harmful compounds. The subject also explains how temperature, acidity, oxygen, light and moisture affect them.

Scope and principal functions

Composition and nutritional analysis: Food chemistry identifies nutrients, their molecular forms and their availability to the body. Analytical methods estimate moisture, protein, fat, ash, sugars and micronutrients. This helps compare raw materials, design products and check label claims. For instance, two cereal flours may supply similar energy but differ in dietary fibre and mineral content.

Changes in food components: Heat may gelatinise starch, denature egg protein, melt fat or cause browning reactions. The Maillard reaction between reducing sugars and amino compounds creates the desirable crust of bread, while excessive heating may produce unwanted compounds and destroy some nutrients. Enzymatic browning in cut apples occurs through oxidation of phenolic compounds. Understanding these reactions helps improve cooking and shelf life.

Quality and sensory properties: Consumers judge foods by colour, aroma, flavour and texture. Food chemistry explains colour changes in vegetables, the formation of characteristic aromas during roasting, the setting of gels and the stabilisation of emulsions. It guides formulation so a product has predictable taste, appearance and consistency. Moisture content and water activity help explain whether a biscuit remains crisp or becomes soft during storage.

Food safety: Chemical examination detects unwanted pesticide residues, heavy metals, adulterants, toxins and processing contaminants. Knowledge of oxidation, pH and water activity also supports microbiological control, although microbiology is a separate discipline. An acidic food generally