

**One Year Diploma, Food Processing Examination 2014**

**Model Answer (I)**

**Subject:- Nutrition and Health**

**Paper Code:-405104**

**Set (I) / (II)**

Answer key

**Group-A**

Question No. 1 MCQ/Objective

- (i) c
- (ii) d
- (iii) a
- (iv) a
- (v) b
- (vi) c
- (vii) a
- (viii) d
- (ix) d
- (x) b

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**Answer:- 2 (A)** Nutrition has been defined as food at work in the body. Nutrition includes everything that happens to food from the time it is eaten until it is used for various functions in the body.

The study of science of nutrition deals with what nutrients we need, how much we need, why we need these and where we can get them.

**Importance:-** Nutrition is the result of the kinds of foods supplied to the body and how the body uses the food supplied.

Nutrients are components of food that are needed by the body in adequate amounts in order to grow, reproduce and lead a normal healthy life.

Nutrients are includes water, fat, protein, carbohydrates, minerals and vitamins. Various nutrients are supplied by foods. These nutrients are necessary for our life and also the physical fitness.

Carbohydrate is a major nutrient to provide energy. Our body has two sources of carbohydrate, reserve carbohydrate i.e.-glucose -in the circulating blood and glycogen carbohydrate i.e.-stored in the muscles and liver.

**Fat:-** Fat is essential in the diet. Vegetable oils are rich sources of essential fatty acid.

**Protein:-** It is also important in the diet. It contains 16% of nitrogen. Plants are the primary sources of protein in nature.

**Vitamin and mineral:-** Both are not provide energy but it is essential for the growth and some other functions.

Good nutrition are expressions used to indicate that the supply of the essential nutrients is correct in amount and proportion. It also implies that the utilization of such nutrients in the body is such that highest level of physical and mental health is maintained throughout the life-cycle.

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Answer:- 2 (B)

Macro nutrients are needed in relatively large amounts and micro nutrients are needed in smaller quantity

Macronutrients-

The macronutrients are water, carbohydrates, fats, and protein. The macronutrients (excluding fiber and water) provide structural material (amino acids from which proteins are built, and lipids from which cell membranes and some signaling molecules are built) and energy.

Carbohydrates and proteins provide 17 kJ or approximately (4 kcal) of energy per gram, while fats provide or 37 kJ approximately (9 kcal) per gram.

Carbohydrates and fats molecules consist of carbon, hydrogen, and oxygen atoms. Carbohydrates range from simple monosaccharides (glucose, fructose, galactose) to complex polysaccharides (starch, pectin).

Fats are triglycerides, made of fatty acid monomers bound to a glycerol backbone. Some fatty acids, but not all, are essential in the diet: they cannot be synthesized in the body.

Protein molecules contain nitrogen atoms in addition to carbon, oxygen, and hydrogen. The fundamental components of protein are nitrogen-containing amino acid.

Water, vitamins, minerals, and fiber do not provide energy, but are required for other reasons.

Micronutrients-

Micronutrients in food is minerals, fibre, vitamin and some others antioxidants and phytochemicals

Minerals-

Dietary minerals are the chemical elements required by living organisms, other than the four elements carbon, hydrogen, nitrogen, and oxygen that are present in nearly all organic molecules. Minerals are uses in the less common elements in the diet.

Mineral are classified in two groups: Macro-mineral and trace mineral

Macro-minerals-

Example:- Calcium, magnesium, phosphorus ,potassium, sodium and sulphur etc.

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Trace minerals

**Examples:-** Cobalt, iodine, copper, iron, magnesium, nickel, molybdenum, zinc, selenium etc.

**Vitamins-** Some vitamins are recognized as essential nutrients, necessary in the diet for good health. Vitamin deficiencies may result in disease conditions, including goitre, scurvy, osteoporosis etc.

**Fiber-** Dietary fiber is a carbohydrate that is incompletely absorbed in humans and in some animals. Like all carbohydrates, when it is metabolized it can produce four Calories (kilocalories) of energy per gram.

Dietary fiber consists mainly of cellulose. There are two subcategories: soluble and insoluble fiber. Whole grains, fruits and vegetables are good sources of dietary fiber.

**Soluble fiber.** found in oats, peas, beans, and many fruits.

**Insoluble fiber.** found in whole wheat flour, nuts and vegetables.

**Macro nutrients** gives energy in our body and minor nutrients plays a important role for the developing of our organs in the body.

**Answer 2 (C) Food Sources of minerals:-** milk and milk products, fish, eggs, pulses, leafy vegetables, fruits, rajmah etc.

**Food Sources of vitamins:-** sheep liver, eggs, milk, butter, ghee, cabbage, orange, carrot, papaya, beans, peas etc.

Mineral and vitamins are required in lesser amount in the diet.

Minerals are present in all body tissues & fluids. In bone & teeth the minerals calcium and phosphorus are deposited in protein material. Iron is found as red pigment, hemoglobin.

Minerals are necessary for body-building, for building of bones, teeth, and structural parts of soft tissues. They also play a role in regulation of processes in the body, e.g. Muscle contraction, clotting of blood, nerve stimuli, etc.

Minerals have two distinct characteristics-

(i) Minerals elements do not provide energy.

(ii) Mineral elements are not destroying during food preparation.

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Major minerals-calcium, phosphorus, sulphur, sodium, chloride, magnesium etc.

Trace minerals-Iron, molybdenum, zinc, copper, iodine, nickel etc.

Vitamins are organic substances. Vitamins occur in small amount in food. Vitamins are needed for growth, normal function of the body and normal body processes.

Vitamins are not provide energy, but are the essential in the metabolic reactions, which release energy from carbohydrates, fat and protein.

Answer :-3 (A) Proteins are large organic compounds, which contain carbon, hydrogen, oxygen and nitrogen. Some also contains sulphur, phosphorus, iron and other minerals.

Proteins are built by amino acid. Proteins are amphoteric in nature.

Major food sources of proteins:-Casein from milk and milk products (paneer, ice-cream, cheese), meat, fish, eggs, fruits, beans, peas, cereals (wheat, millets, pulses), globulin in legumes.

Importance of Food Proteins:-

Plants are primary sources of proteins in nature.

Primary function of protein is tissue building. Protein is an essential part of every cell. It provides the essential amino acid. Protein provides the amino acid, needed for the formation of the new cells. The protein amount needed at various stages of life varies with the rate of growth. Infants need more protein per unit of body weight than adolescents, because the rate of growth is the highest during infancy. More protein is needed in the last part of pregnancy.

Cereals and their products are a major source in the Indian diet.

Protein provides energy in our body.

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**Answer:- 3 (B) Food is that which nourishes the body. Food may be defined as anything eaten or drunk, which meets the needs for energy, building, regulation and protection of the body. Food is the raw material from which our bodies are made.**

**Functions of food:-**

(i) **Physiological functions of food:-** Primary function of food is to provides energy. The body needs energy to sustain the involuntary processes essential for continuance of life, to carry out professional, household and recreational activities, to convert ingested into usable nutrients in the body, to grow and to keep warm.

Second functions of food are building the body. The food eaten each day helps to maintain the structure of the adult body, and to replace worn out cells of the body.

Third functions of food are to regulate activities of the body.

(ii) **Psychological functional of food:-** Food must satisfy certain emotional needs. These include a sense of security, love and attention.

(iii) **Social functions of food:-** Food has been part of our community, social, cultural and religious life. Food has been used as an expression of love, friendship and social acceptance. It is also used as a symbol of happiness at certain events in life, for examples, laddu are associated with the celebration of Deepavali and marriage, cakes are associated with Christmas and birthdays.

**Answer :-3 (C)**

The term functional food was first used in Japan in the year 1980.

A functional food is a food given an additional function by adding new ingredients or more of existing ingredients. Functional food is also related to health-promotion or disease prevention.

All foods are functional because they provide varying amounts of nutrients and energy to sustain growth or support vital processes. However, functional foods are generally considered to offer additional benefits that may reduce the risk of disease or promote optimal health.

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Functional foods include processed food or foods fortified with health-promoting additives, like "vitamin-enriched" products.

Fermented foods with live cultures are considered functional foods with probiotic benefits. Oatmeal is a familiar example of a functional food because it naturally contains soluble fiber that can help lower cholesterol levels.

Some foods are modified to have health benefits. An example is orange juice that's been fortified with calcium for bone health. Other examples of functional foods are soya, fish, nut, grains, grape juices, garlic, fruits and vegetables and some fortified foods.

Functional foods are an emerging field in food science due to their increasing popularity with health-conscious consumers and the ability of marketers to create new interest in existing products.

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**Group-B**

**Answer (4) Definition of nutrients:-** Nutrients are components of food that are needed by the body in adequate amounts in order to grow, reproduce and lead a normal healthy life.

There are two types of nutrients: macro-nutrients (water, fat, protein, carbohydrates) or micronutrients (minerals and vitamins).

Macro nutrients are needed in relatively large amounts and micro nutrients are needed in smaller quantity.

The macronutrients are water, carbohydrates, fats, and protein. The macronutrients (excluding fiber and water) provide structural material (amino acids from which proteins are built, and lipids from which cell membranes and some signaling molecules are built) and energy.

Carbohydrates and proteins provide approximately 4 kcal of energy per gram, while fats provide 9 kcal per gram.

Carbohydrates and fats molecule consist of carbon, hydrogen, and oxygen atoms. Carbohydrates range from simple monosaccharides (glucose, fructose, galactose) to complex polysaccharides (starch). Fats are triglycerides, made of assorted fatty acid monomers bound to a glycerol backbone. Some fatty acids, but not all, are essential in the diet: they cannot be synthesized in the body.

Protein molecules contain nitrogen atoms in addition to carbon, oxygen, and hydrogen. The fundamental components of protein are nitrogen-containing amino acids, some of which are essential in the sense that humans cannot make them internally. Some of the amino acids are convertible to glucose and can be used for energy production, just as ordinary glucose, in a process known as gluconeogenesis.

Vitamins, minerals, fiber, and water do not provide energy, but are required for other reasons.

Each nutrients class has its own function to perform, but the different nutrients that perform the same function must act in effective action.



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Functions of different nutrients are as follows:-

- (i) **Water:-** Water is an essential part of the body structure. It is the carrier of the nutrients and also regulator of a number of body functions. Water is essential for utilization of food material in the body and also for elimination of food waste.
- (ii) **Fat:-** Fat are concentrated sources of energy, carrier of fat soluble vitamins and also essential fatty acid. If the excess amount fat is supplied in the diet, these may be stored as fat reserves in the body.
- (iii) **Carbohydrates:-** The main function of carbohydrates is to provide energy. Those are not used immediately for this purpose are stored as glycogen or converted to fat and stored, to be mobilized for energy supplied when needed.
- (iv) **Protein:-** The main function of proteins is to building of new tissues and maintenance and repair of those already built. Protein are precursor of regulatory and protective substances such as enzymes, hormones and antibodies. Energy supply is the secondary function of proteins. Protein in excess requirement can be converted to carbohydrates or fats and stored.
- (v) **Mineral:-** Main function of mineral includes body-building (bones, teeth) and regulation.
- (vi) **Vitamins:-** Vitamins are needed for growth and for regulation of body processes.

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**Answer (5) Food additives are a substances or a mixture of substances, which is added to food and involved in production, processing, packaging and/or storage of foods without being a major ingredients. Additives are generally remain in food, but in some cases they may be removed during processing. Food additives are a substances added to food to preserve flavor or enhance its taste and appearance.**

Some additives have been used for centuries; for example, preserving food by pickling (with vinegar), salting, as with bacon, preserving sweets or using sulfur dioxide as in some wines. With the advent of processed foods in the second half of the 20th century, many more additives have been introduced, of both natural and artificial origin.

**Functions of food additives:-**

- 1. Enhances the shelf life.**
- 2. Improves and maintains the nutritive value of food:**
- 3. Reduces the wastage and improves yield of the products.**
- 4. Improves the colour and appearance of food.**
- 5. Improves body and texture.**
- 6. Improves aroma and taste of food.**
- 7. Enhance the consumer's acceptability of the food.**

**Different food additives:-**

Food additives can be divided into several groups, although there is some overlap between them.

**Acids-** Food acids are added to make flavors "sharper", and also act as preservatives and antioxidants. Common food acids include vinegar, citric acid, tartaric acid, malic acid, fumaric acid, and lactic acid.

**Anticaking agents -**Anticaking agents keep powders such as milk powder from caking or sticking.

**Antifoaming agents -**Antifoaming agents reduce or prevent foaming in foods.

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**Antioxidants** -Antioxidants such as vitamin C act as preservatives by inhibiting the effects of oxygen on food, and can be beneficial to health.

**Food coloring** -Colorings are added to food to replace colors lost during preparation, or to make food look more attractive.

**Emulsifiers** -Emulsifiers allow water and oils to remain mixed together in an emulsion, as in mayonnaise, ice cream, and homogenized milk.

**Flavors** -Flavors are additives that give food a particular taste or smell, and may be derived from natural ingredients or created artificially.

**Flavor enhancers** -Flavor enhancers enhance a food's existing flavors.

**Flour treatment agents** -Flour treatment agents are added to flour to improve its color or its use in baking.

**Humectants** -Humectants prevent foods from drying out.

**Tracer gas** -Tracer gas allow for package integrity testing to prevent foods from being exposed to atmosphere, thus guaranteeing shelf life.

**Preservatives** -Preservatives prevent or inhibit spoilage of food due to fungi, bacteria and other microorganisms.

**Stabilizers** -Stabilizers, thickeners and gelling agents, like agar or pectin (used in jam for example) give foods a firmer texture. While they are not true emulsifiers, they help to stabilize emulsions.

**Nutrients supplements** (Vitamins, amino acid, mineral etc.)

**Sugar substitutes**-Aspartame

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**Answer:-2 (C) Carbohydrates is a major constituent in food. Carbohydrates contain carbon, hydrogen, and oxygen. It gives energy in our body.**

**Carbohydrates are classified mainly in three groups:-**

**(i) Monosaccharides:- This is the simplest class of carbohydrates have a single unit.**

**Mono + Saccharides i.e. one sugar unit**

**Examples:- Glucose**

**(ii) Disaccharides:- Disaccharides contains two unit of sugars and together form a chain.**

**Di + Saccharides i.e. two units of sugar units**

**Examples:- Lactose, Sucrose**

**(iii) Polysaccharides:- Carbohydrates are made up of long chain of sugar.**

**Poly + Saccharides i.e. many sugar units**

**Important sources of carbohydrates in food are given below:-**

<b>Carbohydrates</b>	<b>Main food sources</b>
<b>Monosaccharides</b>	
Glucose	Fruits, corn syrup, honey
Fructose	Fruits, honey
Galactose	Milk
<b>Disaccharides</b>	
Lactose	Milk and milk products
Sucrose	Cane sugar, beet sugar
Maltose	Breakfast cereals
<b>Polysaccharides</b>	
Pectin	Fruits
Starch	Legumes, tubers, grains
Glycogen	Meat
Cellulose & hemicelluloses	Leafs of vegetables