5 Sports and Nutrition

Fastrack Revision

- **Balanced Diet:** A diet which consists of all the essential food ingredients, *viz.*, protein, carbohydrates, fats, vitamins, minerals and water in correct proportion is called **balanced diet**. It refers to the intake of edibles which can provide all the essential nutrients necessary for growth and maintenance of the body in definite amount.
- **Nutrition:** 'Nutrition' is the science of food which deals with the dynamic process in which the food consumed is digested, nutrients are absorbed and distributed to the tissues for utilisation and wastes are disposed-off by the body.

Nutrients are the basic components of food that are essential for human beings to stay away from diseases and live a healthy and energetic life. There are basically two types of nutrients: Macronutrients and Micronutrients.

- **Macronutrients:** Macronutrients are the structural and energy-giving caloric components of our food that include carbohydrates, fats, proteins and water. They constitute majority of an individual's diet and need to be taken in surplus amount.

Macronutrients: Functions and Sources

Nutrients	Functions	Sources
Carbohydrates	Carbohydrates provide energy needed by the body and the nervous system, brain and red blood cells; spare proteins for their important functions (if enough carbohydrates are not available, proteins are used for energy-giving); enable proper utilisation of fat by providing substrates for fat metabolism.	Fruits, cereal grains, milk, sugar, rice, vegetables, pasta, breads.
Proteins	Proteins build and repair body cells; form part of various enzymes, hormones, and antibodies; Provide energy (4 Kcal/ gm).	Milk and milk products, vegetables, grains, fish, eggs, poultry, meat, legumes.
Fats	Fats provide energy (9kcal/g); carry fat-soluble vitamins; are part of cell membranes, membranes around nerves, hormones, bile (for fat digestion).	Meat, poultry, fish, milk and milk products, nuts and seeds, vegetable oils, desi ghee, vanaspati ghee, butter, margarine, cheese.
Water	Water helps in the transportation of nutrients to cells of the body. It is also important for the excretion of waste products. It also regulates body temperature. It also acts as a lubricant.	Water, beverages like tea, coffee, etc., milk, vegetables, fruits, cereals, etc.

- **Micronutrients:** Micronutrients are the vitamins and minerals. They are required in small quantities, but possess great significance for proper functioning of our body.

Water-soluble Vitamins: Functions and Sources

Nutrients	Functions	Sources
Thiamine (Vitamin B_1)	Works as coenzyme: (Thiamine pyrophosphate-TPP) needed for energy metabolism; important for nerve function; needed for DNA and RNA synthesis.	Whole-grain cereals, pulses, peanuts and seeds, mushrooms, green peas, beans, egg yolk and meat.
Riboflavin (Vitamin B_2)	Act as two coenzymes: Flavin Mononucleotide (FMN) and Flavin Adenine Dinucleotide (FAD) needed for energy metabolism; important for normal vision and skin health.	Milk and milk products; animal products like eggs, liver, kidney; green leafy vegetables, *e.g.*, broccoli; whole-grain cereals; legumes.

Niacin (Vitamin B_3)	Part of an coenzymes: Nicotinamide Adenine Dinucleotide (NAD) and Nicotinamide Adenine Dinucleotide Phosphate (NADP) needed for energy metabolism; important for nervous system, digestive system, and skin.	Whole-grain cereals, pulses, meat, poultry, fish, vegetables (especially mushrooms, asparagus, and green leafy vegetables), peanuts and peanut butter. Eggs and milk and milk products lack niacin but are rich sources of EAA-tryptophan which can be converted to niacin in the body when required. 60 mg of tryptophan can be converted to provide 1 mg niacin.
Vitamin B_6 (Pyridoxal pyridoxine and pyridoxamine)	Part of coenzyme pyridoxal phosphate needed for protein and amino acid metabolism and also involved in activity of many enzymes required for carbohydrate, fat and protein metabolism. It also helps in making white blood cells and heme in haemoglobin.	Meat, poultry, fish, nuts, sunflower seeds, pulses, whole grains, spinach, bananas, potatoes.
Biotin (Vitamin B_7)	Functions as coenzyme in metabolic reactions.	Widespread in foods like organ meats, such as liver or kidney; egg yolk; nuts, such as almonds, peanuts, and walnuts; soybeans and other legumes; whole grains; bananas; cauliflower, mushrooms; also produced in intestinal tract by bacteria.
Pantothenic acid (Vitamin B_5)	Part of Coenzyme A (CoA) needed for energy metabolism.	Widespread in foods: milk, meat, peanuts, eggs.
Folic acid (Vitamin B_9)	Part of an enzyme needed for making DNA and new cells, especially red blood cells, formation of neurotransmitters, needed for maintenance of normal blood pressure and reducing risk of cancer.	Green leafy vegetables particularly spinach, pulses, oranges and orange juice, and liver. Other vegetables like cabbage, cauliflower, broccoli are also good sources.
Cobalamin (Vitamin B_{12})	Part of two coenzymes methyl cobalamin and 5-deoxy adenosyl cobalamin, needed for making new cells; important to nerve function.	Meat, poultry, fish, seafood, eggs, milk and milk products; not found in plant foods.
Ascorbic acid (Vitamin C)	Antioxidant, role in collagen formation hence in wound healing, part of an enzyme needed for protein metabolism; important for immune system, helps in iron absorption.	Found in fruits and vegetables, especially citrus fruits, fresh vegetables in the cabbage family, sprouts, amla and guava.

Fat-soluble Vitamins: Functions and Sources

Nutrients	Functions	Sources
Vitamin A (Retinol and its precursor*, beta carotene) *A precursor is converted by the body to the vitamin.	Needed for vision in dim light, healthy skin and mucous membranes, growth of skeletal and soft tissues, immune system health.	Vitamin A from animal sources (retinol): milk, cheese, cream, butter, egg yolk, liver Beta-carotene (from plant sources):, dark green leafy vegetables; red and yellow fruits and vegetables (carrots, pumpkin, mangoes, papaya).
Vitamin D	Needed for proper absorption of calcium and phosphorus; deposition of calcium and phosphorus in bones.	Egg yolks, liver, fatty fish, fortified foods. When exposed to sunlight, the skin can make vitamin D.
Vitamin E	Antioxidant; protects cell walls.	Polyunsaturated plant oils (soybean, corn, cottonseed, safflower); green leafy vegetables; wheat germ; whole grain products; liver; egg yolks; nuts and seeds.
Vitamin K	Needed for proper blood clotting	green leafy vegetables and cabbage; milk; also produced in intestinal tract by bacteria.

Macro-minerals: Functions and Sources

Minerals	Functions	Sources
Sodium	Needed for proper fluid balance, regulating alkalinity and acidity of body fluids, nerve transmission, and muscle contraction	Table salt, soya sauce; large amounts in processed foods; small amounts in milk, breads, green leafy vegetables, and unprocessed meats
Chloride	Needed for proper fluid balance, stomach acid	Table salt, soya sauce; large amounts in processed foods; small amounts in milk, meats, breads, and vegetables
Potassium	Needed for proper fluid balance, nerve transmission, and muscle contraction	Meats, milk, fresh fruits and vegetables, whole grains, pulses
Calcium	Important for healthy bones and teeth; helps muscles relax and contract; important in nerve functioning, blood clotting, blood pressure regulation, immune system health	Milk and milk products; fish with bones (e.g., sardines); fortified soya milk; greens (broccoli, mustard leaves); pulses
Phosphorus	Important for healthy bones and teeth; found in every cell; part of the system that maintains acid-base balance	Meat, fish, poultry, eggs, milk, processed foods
Magnesium	Found in bones; needed for making protein, muscle contraction, nerve transmission, immune system health	Nuts and seeds; pulses; leafy, green vegetables; seafood; chocolate
Sulphur	Found in protein molecules	Occurs in foods as part of protein in meats, poultry, fish, eggs, milk, pulses, nuts

Micro-minerals: Functions and Sources

Minerals	Functions	Sources
Iron	Iron is a mineral found in every cell of the body. Iron is considered an essential mineral because it is found in red blood cells as part of haemoglobin that carries oxygen to every cell in the body; part of myoglobin needed for muscle contraction, needed for energy metabolism, hence crucial in helping perform physical work	Organ meats; red meats; fish; poultry; egg yolks; whole pulses and whole grain cereals; dried fruits; dark green leafy vegetables (mustard greens, bathua); iron-enriched breads and cereals; and fortified cereals
Zinc	Part of many enzymes needed for synthesizing protein and genetic material; has a function in taste perception, wound healing, normal foetal development, production of sperm, normal growth and sexual maturation, important for immune system	Meats, fish, poultry, whole grains, vegetables
Iodine	Found in thyroid hormone, which helps to regulate growth, development, and metabolism	Seafood, foods grown in iodine-rich soil, iodized salt, bread, dairy products
Selenium	Antioxidant	Meats, seafood, grains
Copper	Part of many enzymes; needed for iron metabolism	Pulses, nuts and seeds, whole grains, organ meats, drinking water
Manganese	Part of many enzymes	Widespread in foods, especially plant foods
Fluorine	Involved in formation of bones and teeth; helps to prevent tooth decay	Drinking water (either fluoridated or naturally containing fluoride), fish, and most teas
Chromium	Works closely with insulin to regulate blood sugar (glucose) levels	Organ meats especially liver, whole grains, nuts, cheese
Molybdenum	Part of some enzymes	Pulses, breads and grains; green leafy vegetables, milk; liver

- **Nutritive Components of Diet:** Nutritive components of diet are those components which contribute to provide energy or calories. There are various nutritive components of diet which are described below:
  - **Proteins:** Proteins provides the body with amino acids, which are the building blocks for muscle and other important structures such as the brain, blood, skin and hair. Proteins form new tissues and repair the broken tissues.
  - **Carbohydrates:** Carbohydrate is also a compound which is formed by the chemical composition of carbon, hydrogen and oxygen. Carbohydrates act like a fuel in our body. They provide energy and are responsible for various digestive operations in our body.
  - **Fats:** Fats are stored in body and used as emergency sources of energy. They also helps in regulation of body temperature and play a vital role in protecting our vital internal organs.
  - **Vitamins:** Vitamin is also an important nutritive component of food just like proteins, carbohydrates and fats. Vitamins are very vital for healthy life. Vitamins protect us from various types of diseases. In fact, vitamins increase immunity power of our body against diseases. They also give their important contribution for the general development of body. Vitamins are of two types—fat-soluble vitamins (A, D, E and K) and water-soluble vitamins (B and C).
  - **Minerals:** Our body contains more than 19 minerals which must be derived from food. However, they are required in small quantities. Main mineral salts found in the body are calcium, phosphorus, iron, magnesium, potassium and iodine. Calcium and phosphorus help in the proper development of teeth and bones. Iron contributes to the formation of haemoglobin content of red blood corpuscles. Iodine helps in the prevention of certain diseases caused by Thyroid action deficiency.
- **Non-nutritive Components of Diet:** Non-nutritive components are those components of food, which don't give energy or calories. They do not have nutritional value and are added to food and beverage products. They are designed to make the food smell better, taste better, last longer and look better. Following are the non-nutritive components of diet:
  - **Fiber or Roughage:** It is undigested part of food which improves intestinal function by adding bulk to food. It is present in fruits, vegetables etc.
  - **Water:** The nutrients are transported to various cells of the body with the help of water. It also regulates the body temperature and is significant in the excretion of waste products.
  - **Colour Compounds:** The food is made more appetising and attractive to see by colour compounds.
  - **Flavour Compounds:** These develops better taste and odours to the food.
  - **Plant Compounds:** These components are present in plants and have been associated with protection or treatment of diseases such as cancer, diabetes, etc.
  - Food groups can also be classified according to their functions:
- **Group 1. Energy Giving Foods:** This category includes foods rich in carbohydrates and fats.
  - Cereals and roots and tubers
  - Sugar and jaggery
  - Fats and oils
- **Group 2. Body Building Group:** This category includes foods rich in protein.
  - Milk and milk products
  - Meat and meat products, fish, egg or poultry
  - Pulses
  - Nuts and oilseeds
- **Group 3. Protective or Regulatory Foods:** This group include foods providing vitamins and minerals.
  - **Fruits**
    - yellow and orange fruits (mango, papaya)
    - citrus fruits (lemon, orange, mausambi)
    - others (apple, banana, etc.)
  - **Vegetables**
    - Green leafy vegetables (spinach, mustard, fenu-greek, etc.)
    - Yellow and orange vegetables (carrot, pumpkin)
    - Others (beans, okra, cauliflower, etc.)
- **Healthy Weight:** A healthy weight is that weight which lowers that risk of various health problems such as heart diseases, stroke, high blood pressure, diabetes, etc., and leads to a healthy life.
- **Body Mass Index (BMI):** It is a measure of body fat calculated on the basis of height and weight. It is applicable to both adult men and women.
- **Method to Calculate BMI:** If you want to know your body mass index, then divide your body weight in kg by the square of your height in metre, *i.e.*,

$$\text{Body Mass Index} = \frac{\text{Weight in kg}}{(\text{Height in m})^2}$$

The WHO criteria for underweight, healthy or normal weight, overweight and obesity of BMI are:

Category	BMI
Underweight	<18.5
Normalweight	18.5-24.9
Overweight	25-29.9
Obesity Class I	30-34.9
Obesity Class II	35-39.9
Obesity Class III	>40

- **The Pitfalls of Dieting:** The major pitfalls of dieting are given below:
  - Extreme reduction of calories
  - Restriction on some nutrients
  - Skipping meals
  - Intake of calories through beverages
  - Under-estimating the calories
  - Intake of labelled food
  - Not performing exercises
- **Food Intolerance:** Food intolerance is a term used widely for varied physiological responses associated with a particular food. In simple words, food intolerance means the individual elements of certain foods that cannot be properly processed and absorbed by our digestive system.

- **Food Myths:** Food myths are beliefs about food that have no scientific base. They are circulated with the intention of promoting good health and healthy living. Though it is not possible to mention all the food myths present all over the world, some of these have been mentioned here:
  - Potatoes make us obese
  - Drinking water along with food makes us fat
  - Skipping meals reduces fat
  - Fat-free eatables help lose weight
  - Consuming milk over fish is injurious to health.
- **Importance of Diet in Sports**

  Some importance of diet in sports are as follows:
  - The body needs nutrition to repair and recover. Sports persons have greater demands on their body. If these are not met through proper diet, outcome will suffer and post training recovery process will be affected.
  - For different games, there are different body composition requirements which can be manipulated to certain extent by nutrient composition of diet besides training, thus helping in achieving body composition goals.
  - Dehydration can impair athletic performance. Therefore, sufficient intake of fluids and electrolytes ensures maximum hydration before, during and after exercise.
  - Adequate diet enhances physiological adaptations during training.
- **Pre-exercise or Pre-competition Requirements (meal)**

  In pre-competition requirement or meal, our main consideration should be as follows:
  - A meal comprising high-carbohydrate, moderate protein and low fibre and low-fat foods providing 500-1000 kcal should be consumed. Examples of good pre-event meal would be banana milk shake or pasta and fruits with curd or potato sandwich with fruit juice.
  - High sugar foods must be avoided to prevent insulin rush that results in early fatigue, cramping, dehydration, nausea and diarrhoea.
  - Meals should be taken about 2-4 hours before exercise or competition.
  - Foods heavy on stomach like fried foods or high fibre foods should be avoided on the day prior to competition.
  - Too much of protein intake should also be avoided as it increases water excretion leading to a state of dehydration. Moreover, proteins are digested slower.
  - Take sufficient liquids or a small snack on hour (or less) before exercise.
- **Requirements or Meal during Competition**

  The main aim during competition and training should be to maintain water balance, control body temperature, sustain normal blood sugar levels and delay fatigue. During small breaks in the events like in tennis, boxing, etc., the consumption of adequate carbohydrate and fluids may be taken care of. In shorter breaks, carbohydrate rich foods like banana, juices, carbohydrate-based drinks (less than 2% concentration) or simply water may be taken. Carbonated beverages, fizzy drinks and drinks that contain caffeine are not recommended.

  If exercising for more than 60 minutes, carbohydrate-electrolyte beverages like diluted fruit juices containing 5 percent to 8 percent carbohydrates can be ingested.
- **Post-competition Requirements**

  Post training or sports competition, recovery of the best body state is required to play or to train the next day to the maximum potential and reduce the chances of injury. The main emphasis during recovery phase must be on the following:
  - To replace fluids lost during exercise.
  - To refill carbohydrate stores (muscle and liver glycogen).
  - To replace electrolytes (sodium, potassium, chloride).

Practice Exercise

Multiple Choice Questions

Q 1. A ..... diet contains all the essential food constituents necessary for growth and maintenance of our body.

a. strict b. balanced
c. prescribed d. consistent

Q 2. Balanced diet is related to: *(CBSE 2021 Term-1)*

a. Consuming right amount of vitamins
b. Consuming correct ratio of carbohydrates and facts
c. Consuming all the nutrients in right amount
d. Consuming excess of protein and minerals

Q 3. During the morning assembly in the school, Anu fell unconscious. She was taken to nearby doctor. The doctor declared her malnourished and advised her to take balanced diet everyday.

Balance diet consists: *(CBSE 2021 Term-1)*

a. macro nutrients
b. micro nutrients
c. nutritive and non-nutritive components
d. nutritive component

Q 4. Carbohydrates, which are soluble in water and crystalline in structure. *(CBSE SQP 2022-23)*

a. Simple b. Complex
c. Compound d. Complicated

Q 5. One gram of carbohydrate contains ..... calories. *(CBSE SQP 2023-24)*

a. 2 b. 3 c. 4 d. 5

Q 6. The food component present in sugar is: *(CBSE 2020)*

a. fats b. protein
c. vitamin d. carbohydrate

Q 7. The body building nutrient is:

a. fat b. vitamin
c. protein d. mineral

Q 8. Jatin is a weightlifter in the 96 kg category. He has to participate in a weightlifting competition next week for which he is taking good care of his practice and diet. He has included all the essential nutrients in his diet. Based on this case, answer the following questions.

What do you think would be the most important component of Jatin's diet? *(CBSE SQP 2021 Term-1)*

a. Proteins b. Carbohydrates
c. Vitamins d. Minerals

Q 9. Which statement is not true about protein? *(CBSE SQP 2021 Term-1)*

a. Protein forms new tissues
b. Protein regulates the balance of water and acids
c. Protein helps in production of hormones
d. Protein makes antibodies

Q 10. Following are energy giving food except: *(CBSE 2021 Term-1)*

a. Cereals b. Sugar and Jaggery
c. Fats and Oil d. Yellow and Orange fruits

Q 11. What is the ratio of carbon, hydrogen and oxygen in carbohydrates? *(CBSE SQP 2021 Term-1)*

a. 1:2:1 b. 2:2:1 c. 2:1:1 d. 1:2:2

Q 12. Which amongst these is not a micro mineral? *(CBSE SQP 2022-23)*

a. Iodine b. Magnesium
c. Iron d. Copper

Q 13. Which amongst these is not a macro mineral? *(CBSE SQP 2021 Term-1)*

a. Calcium b. Potassium
c. Phosphorus d. Iodine

Q 14. Who discovered Vitamin A? *(CBSE SQP 2021 Term-1)*

a. Dr. McCollum b. Dr. Coubertin
c. Dr. J.B.Nash d. Dr. Harvard

Q 15. Role of water in human body is to ..... . *(CBSE 2023)*

a. regulate body temperature
b. give energy
c. repair cell
d. protect from disease

Q 16. Which of the following are water soluble vitamins? *(CBSE 2023)*

a. Vitamin D and K b. Vitamin B and C
c. Vitamin A and E d. Vitamin A and C

Q 17. The main source of Vitamin C is: *(CBSE 2020)*

a. guava b. egg
c. milk d. banana

Q 18. Match List-I with List-II and select the correct answer from the codes given below:

List-I (Vitamins)	List-II (Sources)
A. Vitamin A	(I) Spinach, Cabbage
B. Vitamin K	(II) Sunlight, Cod liver oil
C. Vitamin C	(III) Papaya, Carrot
D. Vitamin D	(IV) Lemon, Orange

	A	B	C	D
a.	(iii)	(I)	(II)	(IV)
b.	(I)	(II)	(IV)	(III)
c.	(IV)	(III)	(I)	(II)
d.	(III)	(I)	(IV)	(II)

Q 19. Match the following vitamins with their functions:

List-I	List-II
A. Vitamin K	(I) Need for blood clotting
B. Vitamin D	(ii) For protection of cell wall
C. Vitamin E	(iii) For vision in dim light
D. Vitamin A	(iv) For absorption of calcium and phosphorus

(CBSE 2021 Term-1)

	A	B	C	D
a.	(i)	(iv)	(iii)	(ii)
b.	(I)	(II)	(III)	(IV)
c.	(ii)	(iv)	(iii)	(i)
d.	(i)	(iv)	(ii)	(iii)

Q 20. What is the other name for vitamin B_2? *(CBSE SQP 2021 Term-1)*

a. Niacin b. Thiamin
c. Folic Acid d. Riboflavin

Q 21. Match the following vitamin with the disease caused due to their deficiency: *(CBSE SQP 2021 Term-1)*

List-I (Vitamins)	List-II (Sources)
A. Vitamin A	(i) Rickets
B. Vitamin B	(ii) Night blindness
C. Vitamin C	(iii) Beri beri
D. Vitamin D	(iv) Scurvy

	A	B	C	D		A	B	C	D
a.	(iv)	(iii)	(ii)	(i)	b.	(iv)	(i)	(ii)	(iii)
c.	(iii)	(ii)	(iv)	(I)	d.	(iii)	(iv)	(I)	(II)

Q 22. Match the following minerals with their functions:

List-I	List-II
A. Iron	(I) Found in red blood cell
B. Calcium	(II) Found in thyroid hormone
C. Sodium	(III) Needed for muscle contraction
D. Iodine	(iv) For healthy bone and teeth

Select the correct answer: *(CBSE 2021 Term-1)*

	A	B	C	D		A	B	C	D
a.	(I)	(iv)	(iii)	(ii)	b.	(I)	(iv)	(II)	(iii)
c.	(I)	(II)	(III)	(iv)	d.	(I)	(II)	(iv)	(III)

Q 23. Carrot and orange come under: *(CBSE 2021 Term-1)*

a. energy giving foods
b. body building foods
c. protective or regulatory foods
d. normal foods

Q 24. Which vitamins were consumed the most during Covid? *(CBSE 2021 Term-1)*

a. Vitamin C and D b. Vitamin B and C
c. Vitamin A and B d. Vitamin B and D

Q 25. Match the following:

List-I	List-II
A. Vitamin B_{12}	(I) Thiamine
B. Vitamin B_3	(II) Biotin
C. Vitamin B_7	(III) Cobalamin
D. Vitamin B_1	(IV) Niacin

(CBSE SQP 2021 Term-1)

	A	B	C	D		A	B	C	D
a.	(iv)	(iii)	(i)	(ii)	b.	(ii)	(iii)	(iv)	(i)
c.	(i)	(ii)	(iii)	(iv)	d.	(iii)	(iv)	(ii)	(i)

Q 26. ..... helps in smooth elimination of stool or faeces. *(CBSE 2021 Term-1)*

a. Carbohydrates b. Roughage
c. Minerals d. Vitamins

Q 27. Which of the following is healthy weight BMI for men?

a. <18.5 b. 18.5-24.9
c. 25.0-29.9 d. 35-39.9

Q 28. Which amongst these is a food myth?

a. Drinking while eating makes us fat
b. Skipping meals reduces weight
c. Both a. and b.
d. None of the above

Assertion & Reason Type Questions

Directions (Q. Nos. 29-34): *There are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the appropriate option from the options given below:*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.

Q 29. **Assertion (A): Micro nutrients are required in very small amounts.**
Reason (R): Micro nutrients are extremely significant for normal functioning of the body.

Q 30. **Assertion (A): Scurvy is caused due to the deficiency of vitamin C.**
Reason (R): The disease sets in when the diet does not include fresh vegetables and fruits for a long time. *(CBSE SQP 2023-24)*

Q 31. **Assertion (A): UNICEF says that water is not included in macro nutrients but USDA includes it as part of macro nutrients.** *(CBSE SQP 2021 Term-1)*
Reason (R): Water must be taken in large quantities therefore it can be considered a macro nutrient.

Q 32. **Assertion (A): Water helps in the transportation of nutrients and excretion of waste products.**
Reason (R): Water is a compound which consists of hydrogen and oxygen in the ratio 2:1.

Q 33. **Assertion (A): Anemia is caused due to the deficiency of iodine.**
Reason (R): Iodine is essential for the production of hormones in the thyroid gland.

Q 34. **Assertion (A): Sodium maintains the balance of acid and base.**
Reason (R): It is found in sea food and chocolate.

Answers

1. (b) balanced
2. (c) Consuming all the nutrients in right amount
3. (c) Nutritive and Non-nutritive components
4. (a) Simple
5. (c) 4
6. (d) carbohydrate
7. (c) protein
8. (a) Proteins
9. (c) Protein helps in production of hormones
10. (d) Yellow and Orange fruits
11. (a) 1 : 2 : 1
12. (b) Magnesium
13. (d) Iodine
14. (a) Dr. McCollum
15. (a) regulate body temperature
16. (b) Vitamin B and C
17. (a) guava
18. (d) A-(iii) B-(i) C-(iv) D-(ii)
19. (d) A-(i) B-(iv) C-(ii) D-(iii)
20. (d) Riboflavin
21. (b) A-(iv) B-(i) C-(ii) D-(iii)
22. (a) A-(i) B-(iv) C-(iii) D-(ii)
23. (c) protective or regulatory foods
24. (a) Vitamin C and D
25. (a) A-(iv) B-(iii) C-(i) D-(ii)
26. (b) Roughage
27. (b) 18.5-24.9
28. (c) Both a. and b.
29. (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
30. (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
31. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
32. (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
33. (d) Assertion (A) is false, but Reason (R) is true.
34. (c) Assertion (A) is true, but Reason (R) is false.

Case Study Based Questions

Case Study 1

Read the following passage and answer the following questions.

Gopichand, a student of class XII, has recently joined a gym near his house to get a toned and muscular body. He consults his gym trainer regarding his diet and is advised to increase the intake of protein in his diet.

Q 1. Proteins are also known as:

a. nitrogenous food b. body building food
c. Both a. and b. d. fatty food

Q 2. Which of the following diseases is caused by protein deficiency?

a. Rickets b. Marasmus
c. Scurvy d. Xerophthalmia

Q 3. Which of the following statements is true about proteins?

a. Proteins are made up of amino acids.
b. Protein is the only nutrient that can build, repair and maintain body tissues.
c. Protein helps in antibodies formation
d. All of the above

Answers

1. (c) 2. (b) 3. (d)

Case Study 2

Read the following passage and answer the following questions.

On a scheduled health check-up, Parag a student of class VII was diagnosed with beri-beri disease. His parents are very concerned about his health and asked the doctor more about this disease.

Q 1. According to the doctor this disease is caused due to deficiency of:

a. Vitamin B_2 b. Vitamin B_5
c. Vitamin B_1 d. Vitamin B_{12}

Q 2. This Vitamin is also called:

a. Thiamine b. Niacin
c. Riboflavin d. Biotin

Q 3. Symptoms of beri-beri are:

a. shortness of breath b. swelling in the feet
c. loss of appetite d. All of these

Answers

1. (c) 2. (a) 3. (d)

Case Study 3

Below given is the details of different types of vitamins required for our body:

Q 1. The vitamins and minerals are collectively known as ..... foods:

a. body building b. protective
c. energy giving d. facilitating

Q 2. Fat soluble vitamins are:

a. Vitamin A and D b. Vitamin A and K
c. Vitamin E and D d. Vitamin A, D, E and K

Q 3. Which of the following statement is false about Vitamin C?

a. It helps in healing the wounds.
b. It is also known as ascorbic acid.
c. It is found in meat, milk products and seafood.
d. It is a highly effective antioxidant.

Answers

1. (b) 2. (d) 3. (c)

Very Short Answer Type Questions

Q 1. What is meant by a balanced diet?

Ans. A diet which consists of all the essential food ingredients *viz.*, proteins, carbohydrates, fats, vitamins, minerals and water in correct proportion is called a balanced diet.

Q 2. Write briefly about 'Micronutrients'. *(CBSE 2019)*

Ans. Micronutrients are vitamins and minerals which are required in very small quantities, but possess great significance for normal growth and functioning of the body.

Q 3. Fats are derived from two sources. Name them. *(CBSE 2017)*

Ans. There are two sources of fats:

(i) Animals: Ghee, butter, curd, eggs, milk and meat.

(ii) Vegetables: Coconut, soybean, mustard and groundnut.

Q 4. Enlist two sources for calcium and iron separately. *(CBSE 2015)*

Ans. There are two sources for calcium and iron:

Sources of Calcium: Milk, cheese, green vegetables, etc.

Sources of Iron: Meat, dry fruits, egg etc.

Q 5. Enlist two non-nutritive components of diet.

Ans. Fibre (roughage), water, plant compounds, flavour compounds and colours are the non-nutritive components of diet.

Short Answer Type-I Questions

Q 1. Differentiate between Macro and Micro Nutrients. *(CBSE 2023)*

Ans. Difference between Macro and Micro Nutrients are as follows:

Macronutrients are the structural and energy-giving calorific components of our food that include carbohydrates, fats, proteins and water.

Micronutrients, on the other hand, are vitamins and minerals which are required in small quantities but possess great significance for proper functioning of our body.

Q 2. What do you mean by nutritive and non-nutritive components of diet?

Ans. Nutritive components of diet are those components which contribute to provide energy (calories).

Non-nutritive components are those components which don't give energy, but are added to make the food smell better, taste better and look better.

Q 3. What should be the basic nutrient in a weightlifter's diet and why? *(CBSE SQP 2022-23)*

Ans. Proteins should be the basic nutrient in a weightlifter's diet because of the following reasons:

(i) Protein build and repair body cells.

(ii) Proteins form part of various enzymes, hormones and antibodies.

(iii) Proteins also provide energy (4 Kcal/g).

Q 4. What do you mean by vitamin? Explain about fat-soluble and water-soluble vitamins.

Ans. Vitamins are protective food constituents which protect us from different diseases and revitalise our body by strengthening our immune system.

The vitamins which are soluble in fats are called fat-soluble vitamins (vitamin A, D, E and K)

The vitamins which are soluble in water are called water-soluble vitamins (vitamin B and C).

Q 5. Enlist the forms of vitamin B complex and explain any one of them in brief.

Ans. The forms of vitamin B complex are as follows:

(i) Vitamin B_1 (ii) Vitamin B_2

(iii) Vitamin B_3 (iv) Vitamin B_5

(v) Vitamin B_6 (vi) Vitamin B_7

(vii) Vitamin B_9 (viii) Vitamin B_{12}

Vitamin B_1: It play a vital role in maintaining a healthy nervous system. Beri-beri is caused due to its deficiency. Various sources of vitamin B_1 include wheat, groundnuts, orange and green peas.

Q 6. What is roughage? Explain in brief.

Ans. The undigested part of food or which cannot be digested by the human intestinal tract is known as roughage. Its majority consists of water and improves intestinal function by adding bulk to the food. The various sources of roughage are fresh fruits, vegetables, oats etc.

Q 7. Explain the importance of fluid intake during a competition. *(CBSE SQP 2023-24)*

Ans. Importance of fluid intake during a competition are as follows:

(i) To maintain water balance.

(ii) Help to transport nutrients throughout the body.

(iii) Help to remove waste from the body.

(iv) Maintain blood sugar level and to delay fatigue.

Q 8. Write importance of diet in sports:

Ans. Some importance of diet in sports are:

(i) The body needs nutrition to repair and recover. Sports persons have greater demands on their body. If these are not met through proper diet, outcome will suffer and post training recovery process will be affected.

(ii) For different games, there are different body composition requirements which can be manipulated to certain extent by nutrient composition of diet besides training, thus helping in achieving body composition goals.

(iii) Dehydration can impair athletic performance. Therefore, sufficient intake of fluids and electrolytes ensures maximum hydration before, during and after exercise.

(iv) Adequate diet enhances physiological adaptations during training.

Short Answer Type-II Questions

Q 1. Define balanced diet. Explain any four micronutrients. *(CBSE 2020)*

Ans. A diet which comprises adequate amounts of necessary nutrients i.e. proteins, carbohydrates, fats, vitamins, minerals and water, required for growth and development of our body is called a balanced diet.

Vitamins (A, B, C, D, E and K) and minerals (calcium, phosphorus, iodine, iron, etc.), are classified as micronutrients.

(i) Vitamin A: It is important for the maintenance of the immune system and strengthening of vision, especially in dim low light.

(ii) Vitamin C: It helps in healing wounds and is also a highly effective antioxidant.

(iii) Calcium: It is necessary for the development of strong bones and teeth. It also helps in the normal functioning of heart, nerves and muscles.

(iv) Iron: It is important for formation of haemoglobin, which is crucial for transporting oxygen to various tissues and organs.

Q 2. What are carbohydrates? Differentiate between its types. *(CBSE SQP 2022-23)*

Ans. Carbohydrates are organic compounds made up of carbon, hydrogen and oxygen. Carbohydrates are a major source of energy.

There are three types of carbohydrates, namely:

Monosaccharides, disaccharides and polysaccharides.

(i) Monosaccharides are simple single units of sugars like glucose, fructose and galactose.

(ii) Disaccharides are when two monosaccharides are combined together like maltose (glucose + glucose), lactose (glucose + galactose) and sucrose (glucose + fructose).

(iii) Simple sugars (mono and disaccharides) are found in fruits (sucrose, glucose and fructose) and milk (lactose).

(iv) Polysaccharides are more than two units of monosaccharides joined together. These are starches and fibre (cellulose). These are also called complex sugars and are found in whole grain cereals, rice, oats, potatoes, bread, legumes, corn and flour.

Q 3. Write briefly about protein as an essential component of diet. *(CBSE 2016)*

Ans. Proteins is a compound which contains the elements namely carbon, hydrogen, oxygen, nitrogen and sulphur. They are known as the building blocks of the body as they are needed for growth, development and repair of tissues. They are the main constituent of antibodies that protect our body against pathogens, thus preventing infections. The sources of protein include grains, legumes, pulses, soybeans whereas we can also get proteins from the animal sources such as meat, eggs, milk etc.

Q 4. Describe fats. What are the different sources of fats? List two important functions of fats.

Ans. Fat is an essential nutritive component of food. It is made up of carbon, hydrogen and oxygen. They serve both as energy sources and storage for excess energy, when the body needs them immediately.

Sources of Fat:

(i) Animal Sources: Animals are good source of fats as they provide various products such as ghee, butter, milk, meat and eggs.

(ii) Vegetable Sources: Fats are obtained from many vegetables such as coconut, soybean, dry fruits, mustard oil etc.

Functions:

(i) They play a vital role in protecting our vital internal organs against shock.

(ii) They are essential for the absorption of fat-soluble vitamins (A, D, E and K) in our body.

Q 5. What are vitamins? Briefly explain the sources of fat-soluble vitamins.

Ans. Vitamins are an essential micronutrient which an organism needs in small quantities for proper functioning and general development of body. Vitamins increases immunity in our body and thus, protects us from diseases.

Sources of fat-soluble vitamins are as follows:

(i) Sources of Vitamin A: It is mainly found in ghee, milk, curd, egg yolk, papaya, carrot etc.

(ii) Sources of Vitamin D: It is mainly supplied by sunlight and is found in milk, cream, cod liver oil, tomato etc.

(iii) Sources of Vitamin E: Food items rich in vitamin E are kidney, liver, green vegetables, sprouted seeds, dry fruits etc.

(iv) Sources of Vitamin K: The richest sources of vitamin K are spinach, cabbage, cauliflower, potato etc.

Q 6. Write the functions of vitamin D and vitamin K and mention their sources. *(CBSE 2023)*

Ans.

Nutrients	Functions	Sources
Vitamin D	Needed for proper absorption of calcium and phosphorus; deposition of calcium and phosphorus in bones.	Egg yolks, liver, fatty fish, fortified foods. When exposed to sunlight, the skin can make vitamin D.
Vitamin K	Needed for proper blood clotting.	Green leafy vegetables and cabbage; milk; also produced in intestinal tract by bacteria.

Q 7. What are the pitfalls of dieting? *(CBSE 2020)*

Ans. The important pitfalls of dieting are as follows:

(i) Extreme Weight Loss: Due to intensive diet schedule and insufficient intake of calories, the individuals suffer imbalance in their health, calorie loss, thereby turning into a major weight loss, which is considered dangerous for them as it affects the metabolism and efficiency of their bodies.

(ii) Insufficient Intake of Nutrients: The insufficient and limited intake of nutrients like carbohydrate, fats and proteins, adversely affects the human body and results in improper functioning.

(iii) Skipping of Meals: It has been proved scientifically that if we skip a meal, we intake more than required in our next meal. So, skipping a meal works in the opposite direction for us and disrupts our weight loss strategy.

(iv) Excess Intake of Liquids: Some people think that eating less and consuming more through liquids will help them reduce extra weight. In fact, consuming more beverages, sweetened juices, sodas and coffee with cream contribute on a large scale towards gaining of weight.

(v) Underestimating Physical Exercise: Dieting without performing any physical activity or exercise is insufficient to lose weight. If an individual really wants the desired outcomes, he should follow proper diet as well as exercise schedule which is very beneficial in reducing weight. (Any three)

Long Answer Type Questions

Q 1. Explain macronutrients and their role in our diet. *(CBSE 2019)*

Ans. Macronutrients are the structural and energy-giving caloric components of food that are required in surplus amount and includes carbohydrates, fats, proteins and water. Each of these macronutrient plays an important role in our diet, as given below:

(i) **Carbohydrates:** Carbohydrates provide the body with fuel. These are known as the energy-giving nutrients and are responsible for various digestive operations in our body.

(ii) **Fats:** Fats serve both as energy sources and storage of excess energy, when the body needs them immediately. Fats keep us warm and play a vital role in protecting our vital internal organs.

(iii) **Proteins:** Proteins provides the body with amino acids, which are the building blocks for muscle and other important structures such as the brain, blood, skin and hair. Proteins form new tissues, repair the broken tissues, regulate balance of water and acids and transport oxygen and nutrients.

(iv) **Water:** Its main function is to supply essential nutrients to different cells of our body. It also helps in excretion of wastes products. It is recommended to drink 6-8 glasses of water to maintain proper hydration in our body. It also regulates the body temperature.

COMMON ERROR

Generally students get confused between macronutrients and nutritive components of diet.

Q 2. What are the nutritive and non-nutritive components of diet? Explain. *(CBSE 2017)*

Ans. Nutritive components of diet are those compounds which provide energy or calories. The various nutritive components of diet are as follows:

(i) **Carbohydrates:** They act like a fuel and provides energy to the body. Various sources of carbohydrates are rice, pulses, bajra etc.

(ii) **Proteins:** They are necessary for growth and development, and repair of various tissues. Proteins are found in eggs, milk products, soybean etc.

(iii) **Fats:** They are stored in body and used as emergency sources of energy. They also helps in the regulation of body temperature and give protection to vital organs like heart etc. Fats are found in ghee, butter, coconut etc.

(iv) **Vitamins:** These are protective food constituents which protect us from different diseases and revitalise our body by strengthening our immune system.

(v) **Minerals:** These are those essential nutrients in our body which are responsible for formation of teeth, blood clotting, proper physical growth and maintaining water balance.

Non-nutritive components of diet are those compounds that do not provide energy or calories. The various non-nutritive components of diet are as follows:

(i) **Fiber of Roughage:** It is undigested part of food which improves intestinal function by adding bulk to food. It is present in fruits, vegetables etc.

(ii) **Water:** The nutrients are transported to various cells of the body with the help of water. It also regulates the body temperature and is significant in the excretion of waste products.

(iii) **Colour Compounds:** The food is made more appetizing and attractive to see by colour compounds.

(iv) **Flavour Compounds:** These develops better taste and odour to the food.

(v) **Plant Compounds:** These components are present in plants and have been associated with protection or treatment of diseases such as cancer, diabetes etc.

Q 3. Vitamins are very essential for working of the body and are divided into two groups. Explain about them.

Ans. Vitamins are of two types:

(i) **Fat-soluble Vitamins:** These vitamins are vitamin A, vitamin D, vitamin E and vitamin K.

(a) **Vitamin A:** The major functions of vitamin A are growth and development of the human body, and strengthening of vision and immune system. Its deficiency leads to night blindness and xerophthalmia.

(b) **Vitamin D:** This vitamin is very helpful in the formation of teeth and strengthening of bones with the help of calcium and phosphorus attained from food. Its deficiency may cause rickets and osteoporosis.

(c) **Vitamin E:** This vitamin is responsible for increasing fertility among men and women and maintaining proper functioning of the adrenal and sex glands.

(d) **Vitamin K:** It is useful in clotting of blood in our body. The deficiency of this vitamin causes anaemia.

(ii) **Water-soluble Vitamins:** Vitamin B and Vitamin C are water-soluble vitamins.

(a) **Vitamin B Complex:** Vitamin B consists of eight soluble vitamins that play vital roles in certain functions of our body including helping our body to make energy from the food we eat and forming red blood cells.

(b) **Vitamins C:** In humans, vitamin C is essential as a highly effective antioxidant, maintains the health of connecting tissues and formation bones.

Q 4. Describe pre, during and past competition requirements.

Ans. Pre-exercise or Pre-competition Requirements (meal)

In pre-competition requirement or meal, our main consideration should be as follows:

(i) A meal comprising high-carbohydrate, moderate protein and low fibre and low-fat foods providing 500-1000 kcal should be consumed. Examples of good pre-event meal would be banana milk shake or pasta and fruits with curd or potato sandwich with fruit juice.

(ii) High sugar foods must be avoided to prevent insulin rush that results in early fatigue, cramping, dehydration, nausea and diarrhoea.

(iii) Meals should be taken about 2-4 hours before exercise or competition.

(iv) Foods heavy on stomach like fried foods or high fibre foods should be avoided on the day prior to competition.

(v) Too much of protein intake should also be avoided as it increases water excretion leading to a state of dehydration. Moreover, proteins are digested slower.

(vi) Take sufficient liquids or a small snack an hour (or less) before exercise.

Requirements or Meal during Competition

The main aim during competition and training should be to maintain water balance, control body temperature, sustain normal blood sugar levels and delay fatigue. During small breaks in the events like in tennis, boxing, etc., the consumption of adequate carbohydrate and fluids may be taken care of. In shorter breaks, carbohydrate rich foods like banana, juices, carbohydrate-based drinks (less than 2% concentration) or simply water may be taken. Carbonated beverages, fizzy drinks and drinks that contain caffeine are not recommended.

If exercising for more than 60 minutes, carbohydrate-electrolyte beverages like diluted fruit juices containing 5 percent to 8 percent carbohydrates can be ingested.

Post-competition Requirements

Post training or sports competition, recovery of the best body state is required to play or to train the next day to the maximum potential and reduce the chances of injury. The main emphasis during recovery phase must be on the following:

(i) To replace fluids lost during exercise.

(ii) To refill carbohydrate stores (muscle and liver glycogen).

(iii) To replace electrolytes (sodium, potassium, chloride).

Chapter Test

Multiple Choice Questions

Q 1. The main sources of protein are:

a. fish, eggs and meat
b. rice, breads and pasta
c. desi ghee, butter and nuts
d. green leafy vegetables and oranges

Q 2. Which of the following is not an element of carbohydrate?

a. carbon b. oxygen
c. nitrogen d. hydrogen

Q 3. Folic acid is the scientific name of which vitamin?

a. Vitamin B7 b. Vitamin B9
c. Vitamin B6 d. Vitamin B5

Q 4. What is the main function of fluorine mineral?

a. Regulate growth, development and metabolism
b. Helps in formation of bones and teeth
c. Regulate blood sugar levels
d. Helps in muscle contraction

Q 5. Which one of the following is not an example of macro mineral?

a. Iron b. Chromium
c. Iodine d. Calcium

Assertion and Reason Type Questions

Directions (Q. Nos. 6-7): *There are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the appropriate option from the options given below:*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.

Q 6. Assertion (A): Nutrients include carbohydrates, proteins, fats, vitamins, minerals, water and fibre.
Reason (R): Water does not provide energy but is required in large quantity for functioning of metabolic processes in the body.

Q 7. Assertion (A): Vitamins are compounds of carbon which are essential for the normal growth and working of the body.
Reason (R): Vitamin D is essential for normal growth of the body. Deficiency of Vitamin A leads to night blindness and also effects kidneys, nervous system and digestive system.

Case Study Based Question

Q 8. Read the following passage and answer the following questions.

A balanced diet refers to the intake of food constituting the necessary nutrients. Ram shares his knowledge of food and nutrition with neighbours while visiting his grandparents in a village. Ram notices that few people living in the village are suffering with goitre and severe anaemia.

(i) Minerals are placed under ..... nutrient category on the basis of required quantity.

a. micro b. macro

c. roughage d. non-nutritive

(ii) Goitre is caused due to deficiency of .....

a. calcium b. iodine

c. selenium d. iron

(iii) Low levels of which mineral will lead to anaemia?

a. Copper b. Sodium

c. Iron d. Calcium

Very Short Answer Type Questions

Q 9. Why does the weightlifter's diet includes lots of protein?

Q 10. What are vitamins?

Short Answer Type-I Questions

Q 11. Define non-nutritive components of food.

Q 12. Briefly explain the functions and sources of two fat soluble vitamins.

Q 13. Mention the uses of any two minerals in our diet.

Short Answer Type-II Questions

Q 14. Write the sources of 3 micro and 3 macro minerals.

Q 15. What is balanced diet? Elaborate the important nutrients of balanced diet.

Q 16. Mention the sources of carbohydrates.

Long Answer Type Questions

Q 17. What are macro-nutrients? Also explain the function and sources of various macro-nutrients.

Q 18. Write a detailed note on water solute vitamins.