

Section I: All the 14 questions are compulsory

55marks

01. Explain the importance of low-sodium diet?

1mark

Answer: A low sodium diet for the general population is an effective preventive measure for high blood pressure.

02. What are the 5 key principles which can help the human being to influence the long term health?

5marks

Answer: At a certain degree: we can influence our long term health by:

a. eating a variety diet, 1mark

b. forming regular physical activity, 1mark

c. not smoking, 1mark

d. setting adequate fluid and sleep, 1mark

e. Limiting alcohol intake and stress. 1mark

03. What are the important classes of nutrients which are necessary for the health of the body?

3marks

Answer: Six (6) classes of nutrients are important for our body health and include:

Carbohydrates 0.5mark, Proteins 0.5mark, Lipids 0.5mark, Water 0.5mark, Vitamins 0.5mark and Minerals 0.5mark.

04. In order to allow the body to function, the energy trapped in nutrients is transformed into other forms of energy. Show the quantities of energy provided by each nutrient.

4marks

Answer:

a. Fat 0.5mark provides 9Kcal 1mark per gram 0.5mark.

b. Carbohydrates 0.5mark and proteins 0.5mark provide 4kcal 1mark /gram 0.5mark

05. Enumerate the factors which can influence our daily food choices.

2marks

Answer: Our daily food choices are mainly controlled by flavor and texture 0.5mark.

In addition, -personal preferences and lifestyle 0.5mark -past experiences, -cultural factors 0.5mark -economical and health 0.5mark

6. A) What nutrients which do not supply any energy to the body? **1mark**

Answer: The nutrients which do not supply any energy to the body

are: Water, vitamins and minerals **1mark**

B) What is their role? **4marks**

Answer:

They are essential for proper body functioning. **1mark**

Any additional right explanations for each of the three nutrients: 1mark.

Consider at least 2 elements of the answer for the 1mark. Total 3marks, i.e. **1mark**

~~elements per each nutrient = 6 elements of the answer x 0.5mark = 3marks~~

I. Vitamins

1. Vitamins promote the normal growth by providing metabolism and ensuring protection against the viruses. **0.5mark**
2. For the proper growth of the children vitamins are very important. **0.5mark**
3. Vitamins also help in the hormones formation, blood cells and formation of chemicals in our body. **0.5mark**
4. Vitamins are also required for metabolism and they create metabolically active enzymes which are very essential for various functions of our body. **0.5mark**
5. Vitamins also assist in forming bones and tissues. **0.5mark**
6. Vitamins make it possible for other nutrients to be digested, absorbed and metabolized by the body. **0.5mark**
7. Vitamins mainly serve as catalysts for certain reactions in the body. **0.5mark**
8. The fundamentals of cells depend greatly upon vitamins. Vitamins are responsible for keeping cells strong, binding tissues, fighting infections, etc. **0.5mark**
9. Vitamins help regulate metabolism, help convert fat and carbohydrates into energy, and assist in forming bone and tissue. **0.5mark**

II. Minerals

1. They provide structure in forming bones and teeth. **0.5mark**
Several minerals make up the lattice architecture of your bones. Calcium is the most abundant mineral in your body and is found in your bones and blood.

Along with the minerals phosphorus and magnesium, calcium gives your bones strength and density. This mineral also builds and maintains strong, healthy teeth.

2. They help maintain normal heart rhythm, muscle contractility, neural conductivity, and acid-base balance. **0.5mark**

Potassium is important to keep muscles and the nervous system functioning normally. Potassium helps to maintain the correct water balance in the cells of your nerves and muscles. Without this essential mineral, your nerves could not generate an impulse to signal your body to move, and the muscles in your heart, organs and body would not be able to contract and flex.

3. Transport function: Red blood cells - or erythrocytes - carry oxygen to each of our infinite cells, where it is used to generate energy. Red blood cells contain a heme or iron component that binds to oxygen so that it can be transported.

0.5mark

4. They help regulate cellular metabolism by becoming part of enzymes and hormones that modulate cellular activity; **0.5mark**

Some minerals such as calcium are needed in large quantities, while others such as zinc are only needed in trace amounts. Zinc is an essential mineral that is important for keeping your immune system strong and helps your body fight infections, heal wounds and repair cells.

The mineral selenium is also needed in small amounts for immune health. A deficiency of selenium has been linked to an increased risk of heart disease and even some types of cancers.

III. Water:

1. -Provides a medium for translocation of food nutrients in the body. **0.5mark**

2. -Helps in the removal of waste products from the body. **0.5mark**

3. -Maintain the shape and structure of body cells. **0.5mark**

4. -Regulate temperature through sweating and evaporation. **0.5mark**

5. -Water is component of many body fluids and cells. **0.5mark**

6. -Provides a medium through which enzymatic actions can take place. **0.5mark**

7. -Activates chemical reactions through hydrolysis. **0.5mark**

07. Classify nutrients in three groups according to their role in the body. **8marks**

WDA / TVET / HO-2

Answer: 0.5mark x 16 elements of the answer = 8marks

1. Nutrients provide energy 0.5mark: carbohydrates 0.5mark, proteins 0.5mark, lipids (fats and oils) 0.5mark.
2. Nutrients promote growth and development 0.5mark: Proteins 0.5mark, lipids 0.5mark, vitamins 0.5mark, minerals 0.5mark, water 0.5mark.
3. Nutrients regulate body processes 0.5mark: proteins 0.5mark, lipids 0.5mark, vitamins 0.5mark, minerals 0.5mark, and water 0.5mark.

Q8. Name 2 water soluble vitamins and 2 fat soluble vitamins.

4marks

Answer: Note: Vitamin, 0.5mark; Name, 0.5mark

Water-soluble vitamins (2 x 1mark = 2marks)

| <u>Vitamin</u> | <u>Name</u> |
|--------------------|--------------------------|
| Vitamin B1 | Thiamine |
| Vitamin B2 | Riboflavin |
| Vitamin B3 (or PP) | Niacin or Nicotinamide |
| Vitamin B5 | Pantothenic acid |
| Vitamin B6 | Pyridoxine |
| Vitamin B7 (or H) | Biotin |
| Vitamin B9 | Folic Acid |
| Vitamin B12 | Cyanocobalamin/Cobalamin |
| Vitamin C | Ascorbic Acid |

Fat-soluble vitamins (2 x 1mark = 2marks)

| <u>Vitamin</u> | <u>Name</u> |
|----------------|----------------------------|
| Vitamin A | Retinol |
| Vitamin D | Calciferol |
| Vitamin E | Tocopherols / Tocotrienols |
| Vitamin K1 | Phylloquinone |
| Vitamin K2 | Menaphthone |

09. Give three general purposes for which the body uses energy.

3marks

Answer: 1mark x 3 elements of the answer = 3marks

- a. Basal metabolism,
- b. Physical activity
- c. Thermic effect of food

10. Name 6 Fat-rich foods.

3marks

Answer: 0.5mark x 6 elements of the answer = 3marks

1. Plants oils,
2. Butter,
3. Margarine,
4. Mayonnaise,
5. Walnuts,
6. Avocados,
7. Peanut butter,
8. Steak and
9. Hamburger.

11. Give the total numbers and distinguish the two classes of amino acids?

3marks

Answer: 1mark x 3 elements of the answer = 3marks

There are 20 amino acids in total 1mark: 9 amino acids are essential and must be supplied by the diet 1mark and 11 nonessential amino acids can be produced (synthesized) by the body 1mark.

12. Name the essential amino acids.

5marks

Answer: Note: 8 to 9: 5marks, 6-7: 4marks, 4-5: 3marks, 3: 2marks,
1-2: 1mark

1. Lysine,
2. Methionine,
3. Threonine,
4. Valine,
5. Histidine,
6. Isoleucine,
7. Leucine,
8. Phenylalanine,
9. Tryptophan

13. Give 4 foods which are high-quality protein sources and 2 which are lower-quality protein sources.

4marks

Answer:

- a. High-quality protein foods sources: Animal foods such as milk, fish, meal, soybeans. **2marks**
- b. Lower-quality protein foods sources: Plants foods such as beans, nuts. **2marks**

14. What is the role of:

a) Vitamin E?

2marks

Answer: Vitamin E is an antioxidant **1mark**. Vitamin E maintains the integrity of the body's intracellular membrane by protecting its physical stability and providing a defense line against tissue damage caused by oxidation **1mark**.

b) Vitamin K?

3marks

Answer:

1. Vitamin K is vital for blood clotting. The vitamin K stands for coagulation. **1mark**
2. It contributes to the synthesis of several blood-clotting proteins. **1mark**
3. Vitamin K helps to form proteins present in bone, muscle and kidneys, thereby imparting calcium-binding potential to these organs. **1mark**

Section II: Choose and answer any 3 questions

30marks

15. A. Explain the need of water by an adult person to stay healthy as referred to basical approximations? **6marks**

Answer: Water constitutes 50% to 70% of the human body **3marks**. Adult needs about 1 milliliter of water or other fluid for each Kcal expended **3marks**.

- B) Identify 2 situations that increase the need for water. **4marks**

Answer: 2 elements of the answer x 2marks = 4marks

1. Deshydration 2. During illness 3. Vigorous exercise

16. A) Describe the importance of proteins in the body. **7marks**

Answer:

1. Proteins are composed of carbon, oxygen and hydrogen. **1.5mark**
2. Proteins are the main structural building blocks of the body (bone, muscles, blood, cell membranes, enzymes and immune factors). **2marks**
3. Furthermore, proteins can also provide energy for the body: on average 4 kcal per gram. **2marks**
4. Proteins are formed by the linking of amino acids; 20 common acids are found in food, 9 of these are essential nutrients for adults. **1.5mark**

- B) Outline the roles of triglycerides in the body. **3marks**

Answer: 0.5mark x 6 elements of the answer = 3marks

1. Triglycerides supply essential fat acids to the body;
2. Triglycerides supply energy,
3. Triglycerides allow efficient energy storage,
4. Triglycerides insulate and protect the body,
5. Triglycerides transport fat -- soluble vitamins,
6. Triglycerides promote satiety or a feeling of fullness.

17. What are the troubles caused by the shortage or insufficiency of supplement for the following nutrients to the human body? Fill in the table below. 10marks

| S/N | Nutrient | Troubles due to shortage or insufficiency |
|-----|-----------|---|
| 01 | Vitamin K | |
| 02 | Vitamin C | |
| 03 | Vitamin A | |
| 04 | Vitamin D | |
| 05 | Protein | |

Answer: 2marks per every nutrient

| S/N | Nutrient | Troubles due deficiency |
|-----|-----------|---|
| 01 | Vitamin K | Hemorrhage |
| 02 | Vitamin C | 1. Vascular and heart diseases 2. High blood pressure |
| 03 | Vitamin A | 1. Growth problems (late skeletal growth) 2. Night blindness |
| 04 | Vitamin D | Bones' troubles (rickets, Osteoporosis,...) |
| 05 | Protein | Kwashiorkor |

18. Describe fat digestion and fat absorption. 10marks

Answer: 1mark x 10 elements of the answer = 10marks

Fat digestion takes place primarily in the small intestine 1mark where an enzyme released from the pancreas digests dietary triglycerides 1mark into smaller breakdown products namely monoglycerides 1mark and fatty acids 1mark. The breakdown products then are diffused into the absorptive cells of the small intestine 1mark. These products are mostly resynthesized into triglycerides 1mark and combined with cholesterol, protein and other substances 1mark to yield a chylomicron 1mark. Chylomicrons enter the lymphatic system 1mark, in turn passing into the bloodstream 1mark.

19. A) Describe the function of Zinc in the body. Name at least 3 types of food that are sources of Zinc. **6marks**

Answer:

Function: Zinc helps in the action of more than 300 enzymes **0.5mark** that are important for growth **0.5mark**, development **0.5mark**, immune function **0.5mark**, wound healing **0.5mark** and taste **0.5mark**.

Main sources: Red Meat **1mark**, shellfish **1mark**, milk **1mark**, dairy foods such as cheese **1mark**, bread **1mark**, cereal products such as wheat germ **1mark**.

B) Explain the role of Vitamin D in the body. **2marks**

Answer: Vitamin D primarily acts to regulate calcium and bone metabolism **1mark**. This vitamin helps the body to use calcium and phosphorus to form bones and teeth **1mark**.

C) Where does the body find vitamin D? **2marks**

Answer:

1. The body can synthesize vitamin D with adequate sunlight exposure (20 minutes), **1mark**.
2. Otherwise needs can also be met by consuming fatty fish, fortified milk, spinach and vegetables. **1mark**.

SECTION III: CHOOSE AND ANSWER ANY ONE (1) QUESTION 15MARKS

20. Indicate and explain three categories of states of nutritional health?

15marks

Answer: 1mark x 15 elements of the answer = 15marks

a) Desirable nutrition **1mark**, b) Under nutrition **1mark**, c) Over nutrition **1mark**

Desirable nutrition: The nutritional state for a particular nutrient is desirable when body tissues have enough of nutrients to support normal metabolic functions **1mark** as well as surplus stores that can be used in times of increased need **1mark**. A desirable nutritional state can be achieved by obtaining essential nutrients from a variety of foods **1mark**.