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Name : Attia Altaf.

Batch : 63

Subject : General Science & Ability.

⇒ (2) Q. What is role of Carbohydrates and vitamins in the body? Discuss briefly.

Role of Carbohydrate in body.

Role: Provide energy, fiber and structural support for bodily functions.

1 Energy Source:
Fuel brain, muscles and nervous system.

2 Fiber Provider:
Supports healthy digestion and bowel function.

3 Blood Sugar regulation.
Maintains healthy glucose levels

Role of vitamins in body.

Role: Regulate various bodily functions, Support growth and maintenance.

1 Energy Production.
Coenzymes for metabolism (B vitamins)

2 Immune System Support.
Enhances immune response (vitamins C, D)

3 Antioxidant function:-
Protects cells from damage (vitamin C, E)

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Role of Carbohydrates in body:

4. **Immune system Support:-** Enhances immune response.
5. **Eye health:-** Supports vision and Prevents eye diseases.
6. **Exercise Performance:** Essential for physical activity.
7. **Skin, hair and nail health:-** Main-tains integrity and appearance.
8. **Cognitive function:-** Supports focus, Concentration and memory.
9. **Weight management:-** Helps regulate appetite and Satiety.
10. **Gut health:-** Supports beneficial gut bacteria.

Role of Vitamins in body.

4. **Bone health:-** Regulates calcium absorption and bone formation (vitamin D)
5. **Cognitive function:-** Enhances focus, concentration and memory
6. **Vision health:-** Essential for eye function and vision (Vitamin A)
7. **Skin, hair and nail health:-** Maintains integrity and appearance.
8. **Cardiovascular Health** Supports heart function and blood flow.
9. **Reproductive health:-** Essential for fetal development (Folic acid)
10. **Cell growth and differentiation** Regulates gene expression (VA)

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=> 2(b) Discuss the functioning of Liver and Pancreas:-

Liver functions

1. **Detoxification:-** Removes toxins, waste and bacteria from blood.
2. **Metabolism:-** Processes nutrients, hormones and medications.
3. **Bile Production:-** Aids fat digestion and absorption.
4. **Glycogen Storage** Regulates blood sugar levels.
5. **Protein synthesis:-** Produces essential proteins.
6. **Blood Filtration:-** Removes waste and toxins.
7. **Hormone Regulation:-** Breaks down hormones.
8. **Vitamin and Mineral Storage:-** Stores vitamins A, D, E, K and iron.

Pancreas Functions

1. **Digestive Enzyme Production:-** Breaks down carbohydrates, Proteins, and fats.
2. **Insulin Production:-** Regulates blood sugar levels.
3. **Glucagon Production:-** Raises blood sugar levels.
4. **Glucose regulation:-** Maintains blood Sugar homeostasis.
5. **Fat digestion:-** Breaks down fats into fatty acids.
6. **Protein Digestion:-** Breaks down proteins into amino acids.
7. **Carbohydrates Digestion:-** Breaks down carbs into simple sugars.
8. **Electrolyte Balance:-** Regulates sodium, Potassium

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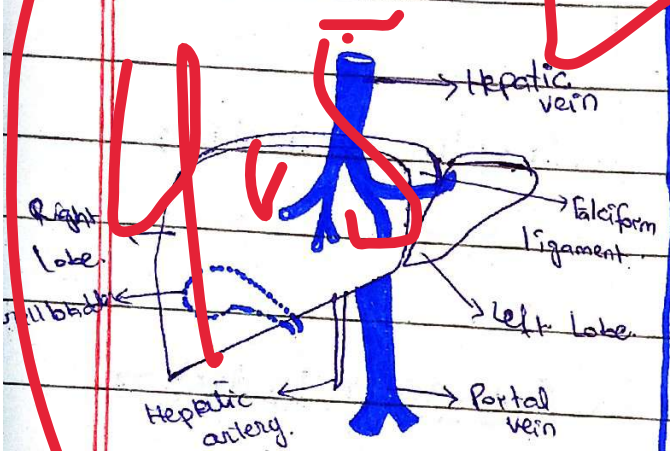
9. **Cholesterol Regulation:-** Maintains healthy cholesterol levels.

10. **Immune System Support:-** Produces immune factors.

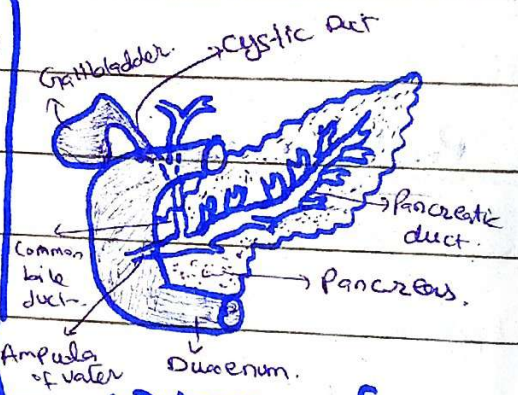


(Structure of Liver)

and chloride levels.

9. **Hormone Regulation:-** Produces somatostatin, Pancreatic polypeptide.

10. **Appetite Regulation:-** Influences hunger and satiety hormones.



(Diagram of Pancreas)

⇒ **2(c) What are the Standards of drinking water? How Heavy Metals in the water effect the living organisms?**

(1) ⇒ **What are the Standards of drinking water:-**

Drinking water standards are crucial for ensuring the water we drink is safe and healthy. The world Health Organization (WHO) has set guidelines

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for drinking water quality, which include parameters such as pH, temperature, turbidity, total dissolved solids, hardness, Chloride, fluoride, and microbiological contaminants.

(2) **Physical Parameters:-**

1. **pH.** According to Pakistan standards pH is 6.5 – 8.5 and According to WHO standards pH is 6.5 – 8.5.
2. **Temperature:-** Less than or equal to 30°C.
3. **Colour :-** ≤ 15 True Colour Units.
4. **Turbidity:-** Less than or equal to 1 NTU (Nephelometric Turbidity Units)
5. **Taste:-** Non objectionable / Acceptable.
7. **Odour:-** Non objectionable / Acceptable.

(3) **Chemical Parameters:-**

(i) **Total Dissolved Solids (TDS):-** Less than or equal to 500 mg/L

(ii) **Hardness:-** Less than or equal to 200mg/L.

(iii) **Chloride:-** Less than or equal to 250mg/L

(iv) **Fluoride:-** Between 0.5 and 1.5mg/L.

(3) **Bacterial / Microbiological Parameters:-**

(i). **E.coli:** E.coli must not be detectable in any 100ml sample.

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⇒ **How heavy metals in the water effect the living organisms:-**

Heavy metals like Lead (Pb), Mercury (Hg), Arsenic (As), Cadmium (Cd), Copper (Cu), Nickel, Zinc (Zn), Chromium (Cr), in water can have devastating effects on living organisms.

1. **Effect on Humans:-**

(i) Neurological damage (Lead, mercury)
(ii) Kidney damage (Cadmium, Lead)
(iii) Cancer (Arsenic, Chromium)
(iv) Reproductive issues (Lead, Mercury)
(v) Respiratory Problems (Chromium)
(vi) Skin irritation and allergies (Nickel, Chromium)
(vii) Hair loss and brittle nails (Copper)

Q 2 (d):

Wat is radioactivity? Discuss the law of radioactivity. Name two radioactive elements.

⇒ **What is radioactivity:-**

Radiactivity is the process by which unsable atomic nuclei lose energy and stability through radiation.

⇒ **Characteristics:-**

1. **Spontaneous:** Radioactivity occurs naturally without external influence.

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2. **Random:**

- Radioactivity Unpredictable decay of individual atoms.

3. **Irreversible:** Radioactivity cannot be reversed or Stopped.

⇒ Law of Radioactivity:-

The Law of Radioactivity, also known as the Radioactive Decay law.

1. Radioactive decay is Spontaneous and random.
2. The rate of decay is proportional to the number of radioactive atoms present.
3. The rate of decay is constant for a given radioactive substance.

⇒ Law of Radioactive Decay Derivation:-

According to the radioactive decay law, when a radioactive material undergoes either α or β or γ decay, the number of nuclei undergoing the decay per unit time is proportional to the total number of nuclei in the given Sample material.

" The Probability per unit time that a nucleus will decay is a constant, independent of time".

It is represented by λ and is called decay constant.

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The mathematical representation of the law of radioactive decay is:

$$\frac{\Delta N}{\Delta t} \propto N$$

Where, N = the total number of nuclei in the sample Δ.

N = Number of nuclei that undergo decay.

Δt = Unit time.

$$\frac{\Delta N}{\Delta t} = \lambda N$$

Where λ = radioactive decay constant, also known as distintegration constant

⇒ **Name of two radioactive elements:-**

1. **Uranium (U):-**

Symbol = U.

Atomic number = 92

Decay mode = Alpha, beta, gamma.

Uses = Nuclear Power, nuclear weapons, radiation shielding.

2. **Radium (Ra):-**

Symbol = Ra.

Atomic Number = 88

Decay mode = Alpha, Beta, gamma.

Uses = Medical applications (cancer treatment), industrial applications (luminescent paints).

Good answers!