

## Part 1 : Answer the following questions.

### Essential elements for life :

✓ Complete the sentences below :

Carbon atoms can form four covalent bonds.

Carbon compounds which life is based on are; carbohydrates,  
lipids, protein, nucleic acids

Metabolism is All the enzyme catalysed reactions in a cell

Anablsim is building larger molecules from smaller molecules

Catabolism is breaking large molecules into smaller molecules

The most common **Elements** found in living things are:

Carbon, Hydrogen, Oxygen, Nitrogen

Other elements & their functions are;

Sulfur - found in some amino acids

Calcium - Bones and teeth, nerve impulses and muscle contractions

Iron - Part of Hemoglobin molecuees

Phosphorous Found in DNA RNA and phospholipids and ATP

## Water :

### ✓ Complete the following :

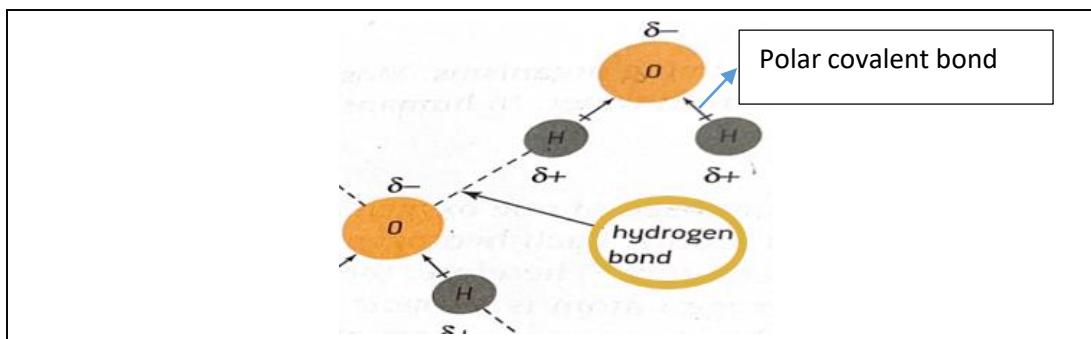
#### Properties of Water:

- cohesive
- adhesive
- excellent solvent
- high specific heat capacity  
(thermal properties)

#### The importance of water for living things

- Transport of substances in blood  
A column of water can be held up in the narrow xylem of plants
- Water is liquid at most temperature
- Water acts as a coolant

### ✓ Draw 2 water molecules in the box below : ( Label the hydrogen bonds and the polar covalent bonds )



### ✓ Describe how hydrogen bonding is important in water.

*Hydrogen bonds causes the unique properties of water :*

*Cohesive*

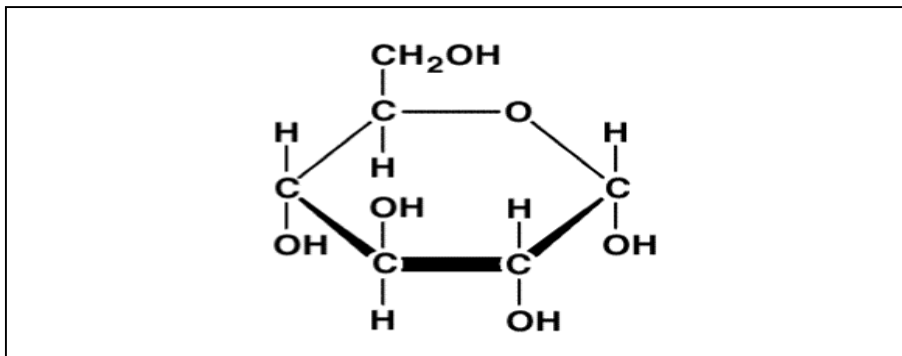
*Adhesive*

*Thermal properties*

*Solvent properties*

## Carbohydrates

✓ Draw a glucose molecule in the box below :



## Lipids

✓ Refer back to the diagram of fatty acids to complete the following sentences :

Fatty acids can be saturated, which means  
they have no double bonds,

or monounsaturated that means

there is a single double bond

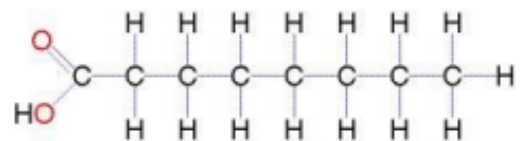
or polyunsaturated.

there is more than one double bond

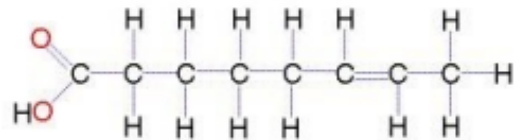
A cis isomer of a fatty acid is.

Cis has both H molecule on the double bond on the same side

Diagrams of fatty acids



saturated fatty acid



unsaturated fatty acid

This is a 'trans'

- ✓ Discuss the reasons why lipids are important as long-term energy storage in animals.

*A fat is made up of a glycerol, which is attached to 3 fatty acid chains. Most of the energy from fats comes from the many carbon bonds in these long, fatty acid chains.*

## Part 2 : Circle the correct answer

1. Carbon is the basis of biological polymers because

- I It can form chains by bonding to other carbon atoms
- II It is found in carbohydrates
- III It can form four covalent bonds

A I only

B I and II only

**C I and III only**

D I, II and III

2. Hydrogen bonding between water molecules is important in living systems because

- I It makes water cohesive
- II It gives water a high specific heat capacity
- III It makes water transparent
- IV It helps water to be a good solvent for polar molecules

A I and III only

B II and IV only

C I and II only

**D I, II and IV only**

**3. Which of the following processes could be described as anabolism?**

- A.  The production of amino acids by the action of enzymes on polypeptides.
- B.  The production of a large DNA molecule from nucleotide monomers
- C.  The conversion of glucose into pyruvate in glycolysis.
- D.  The digestion of starch into maltose in digestion.

**4. Which row of the table shows a correct description of the different types of fatty acid?**

	Saturated fatty acid	Mono-unsaturated fatty acid	Poly unsaturated fatty acid
A	Many double bonds between carbon atoms	One double bond between the carbon atoms	All the carbon atoms are linked by single bonds
B	One double bond between the carbon atoms	Many double bonds between carbon atoms	Many single bonds between carbon atoms
C	All the carbon atoms are linked by single bonds	One double bond between the carbon atoms	Many double bonds between carbon atoms
D	All the carbon atoms are joined by double bonds	One single bond between carbon atoms	Many double bonds between carbon atoms

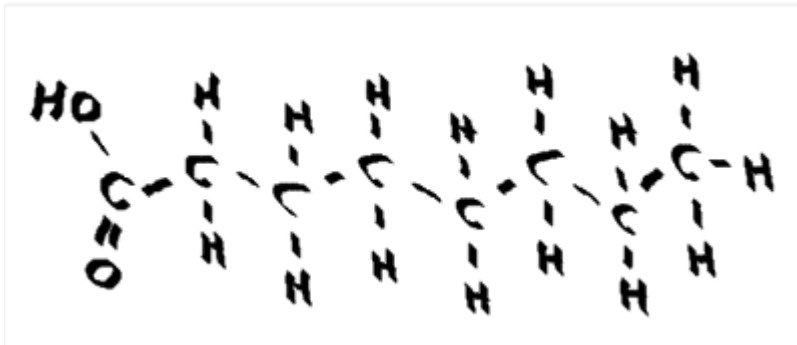
**5. What is meant by cell metabolism?**

- A.  The breakdown of glucose through enzymes catalysed reactions of respiration.
- B.  The enzyme catalysed reactions which control of vitamins and minerals in the cell.
- C.  All of the enzyme catalysed reactions which take place in the cell.
- D.  The production of proteins by a chain of enzyme catalysed reactions.

6. Which of the following correctly identifies the monomers which make a triglyceride molecule when combined.

- A.  Monomers = Fatty acid and three glycerol molecules.
- B.  Monomers = Glycerol, three fatty acids.
- C.  Monomers = Glycerol, three monosaccharides.
- D.  Monomers = Glucose, Fructose and galactose.

7. What type of molecule is shown in the diagram below?



- A.  A fatty acid
- B.  A steroid
- C.  A glycerol
- D.  An amino acid

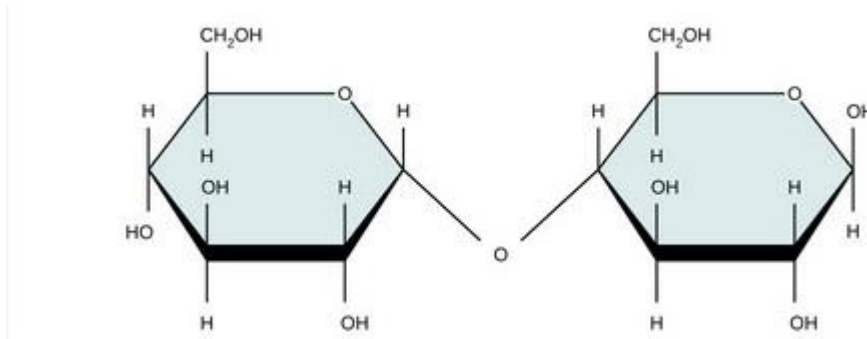
8. To test for a reducing sugar which of the following points best describes the procedure?

- A.  Benedict's reagent is heated for two minutes and if the reducing sugar is present it turns orange/red.
- B.  Iodine is heated and turns orange/red if a reducing sugar is present.
- C.  Biuret reagent turns red if a reducing sugar is present.
- D.  Benedict's reagent is heated and if a reducing sugar is present it turns blue/black.

9. How are carbohydrate monomers, like glucose, linked together and what type of molecules do they form?

- A.  They are linked by condensation reactions and form ester bonds .
- B.  They are linked by condensation reactions and form disaccharides and polysaccharides
- C.  They are linked by peptide bonds and form disaccharides and polysaccharides.
- D.  They are linked by hydrolysis reactions and form disaccharides and polysaccharides.

10. The image below shows a molecule commonly found in the human digestive system



What type of molecule is this?

- A.  A nucleotide base
- B.  A disaccharide
- C.  A di-glyceride
- D.  A di-peptide

11. What are the two polymers which make up starch called, and what is the difference in their structure?

- A.  cellulose, an unbranched molecule and amylose, a branched polysaccharide.
- B.  Amylose, an unbranched molecule and amylopectin, a branched polysaccharide.

- C.  Amylose, a branched molecule and amylopectin, an unbranched polysaccharide.
- D.  Amylose, an unbranched molecule and amylose, a branched polysaccharide.

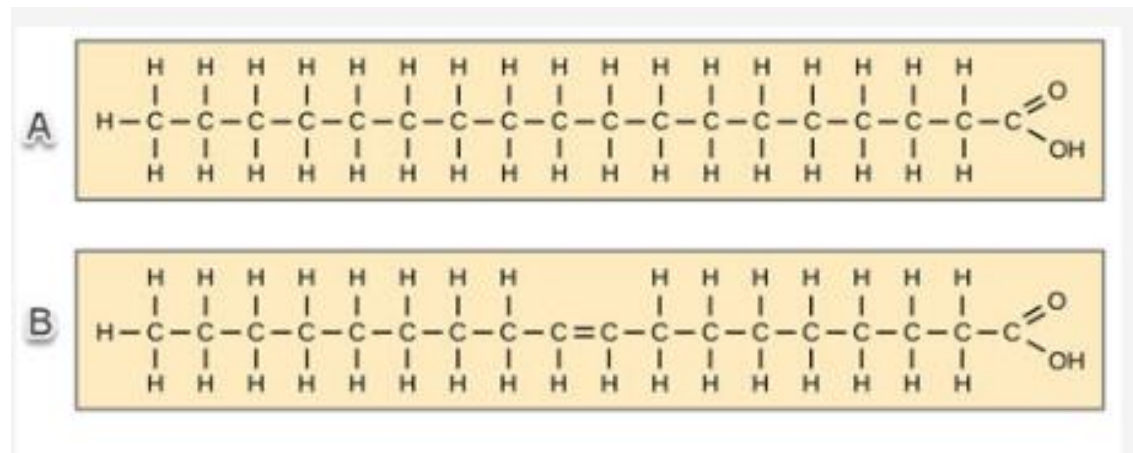
**12. Which property of water makes it more useful as a coolant in sweating?**

- A.  It is adhesive and cohesive.
- B.  It has a high latent heat of vaporization
- C.  It is transparent.
- D.  It has a high melting point.

**13. Plant cell walls contain which of the following in abundance?**

- A.  Lactose
- B.  Cellulose
- C.  Starch
- D.  Glycogen

**14. The molecules below are both of the same type, fatty acids.**





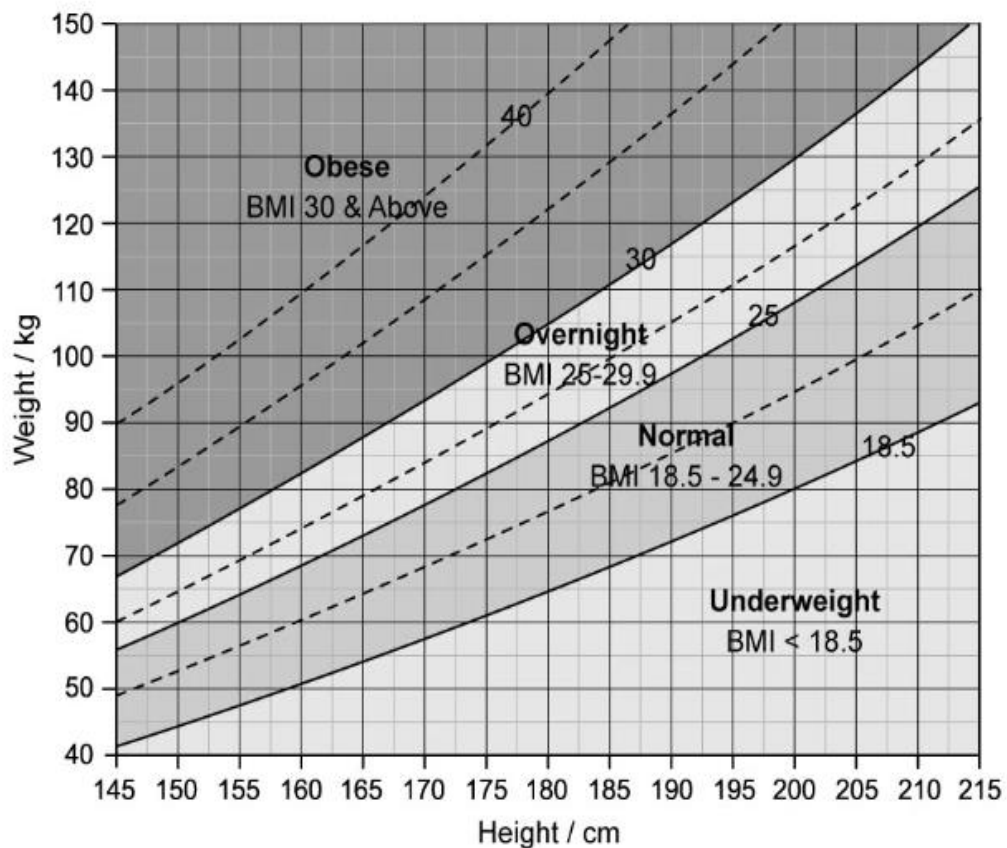
Which of the descriptions of their details is correct.

- A.  A is monounsaturated fatty acid and B is an unsaturated fatty acid.
- B.  A is a saturated fatty acid and B is a polyunsaturated fatty acid.
- C.  A is a trans-fatty acid and B is a cis-fatty acid.
- D.  A is a saturated fatty acid and B is a monounsaturated fatty acid.

## Nomogram

Q1

The nomogram below shows the range and classification of body mass index (BMI) values.



A person of height 170 cm has a mass of 105 kg.

What is the amount of mass this person would have to lose to reach a body mass within the normal BMI range?

A. 15 kg

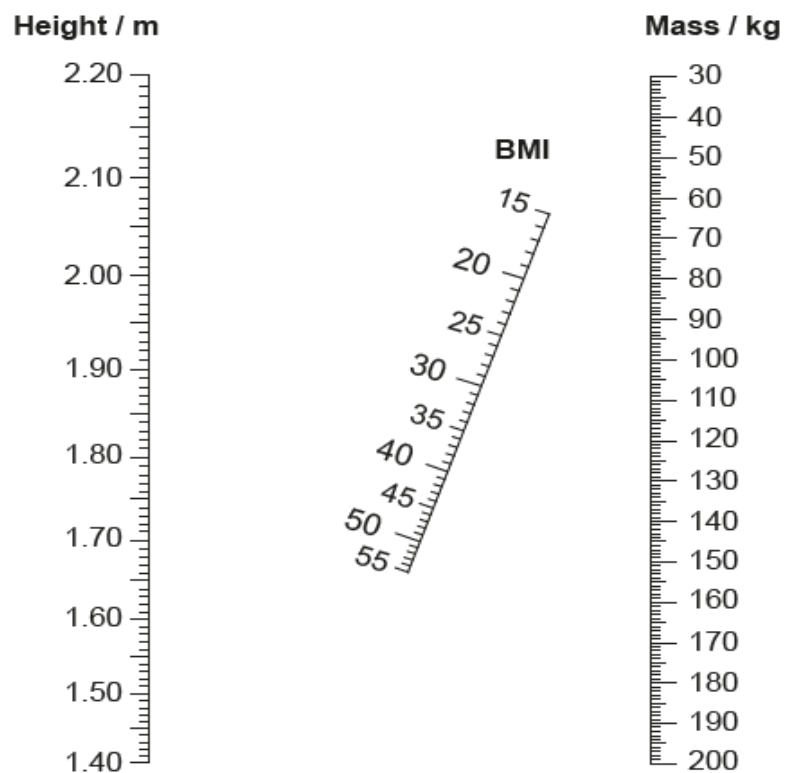
B. 25 kg

C. 35 kg

D. 50 kg

Q2

A nomogram can be used to determine the body mass index (BMI) of an individual.



State the BMI of a person of mass 80 kg and 1.80 m in height.

.....25.....