

41. Explain and compare the structures of nucleic acids (DNA, mRNA, rRNA, tRNA) and explain their main functions in the functioning of the human body.
42. In the cases of malnutrition or undernutrition, the human body can make the arrangements (in the term of his needs) for converting the proteins into carbohydrates or into lipids, the carbohydrates into lipids and vice versa. Explain precisely the process of conversion of lipids into carbohydrates and proteins using the glyoxylate cycle.
43. The human cell completely oxidizes one molecule of 9-methyl heptadecanoic acid to produce energy (ATPs) needed in various cellular activities: explain how this acid is completely oxidized and how those energetic molecules are synthesized by writing precisely the main steps on which ATPs are produced and by indicating the total number of ATP produced on each step. Finally, calculate the total number of ATPs gained by the cell.
44. Explain the enzymatic digestion of the following food lipids in the human digestive tract (by indicating exactly the bonds to be broken down): triglyceride, phosphatidylcholine.
45. Explain the enzymatic digestion of the following food lipids in the human digestive tract (by indicating exactly the bonds to be broken down): triglyceride, phosphatidylcholine.

Introduction			
S/N	Name of the food lipid	Type of bond to be broken down	corresponding enzyme (s)
1	Glycerolipid		
2	Glycerophospholipid		

46. List 8 steroid hormones (2 specific only for males, 2 specific only for females, 4 common for both males & females) synthesized from cholesterol molecules, indicate the site (organ) of synthesis organs and explain precisely the main physiological role of each hormone in the functioning of the human body.

S/N	steroid hormone	Site (organ) of synthesis	Physiological importance
1			
2			
3			
4			
5			
6			

47. The living cells of the human body use mainly the carbohydrates and lipids (and sometimes aminoacids) to produce the energy (ATPs) needed in the various cell activities; and it is known that lipids produce more energy than carbohydrates.
A cell has completely oxidized one molecule of glucose and one molecule of stearic acid to produce the maximum amount of energy: explain and show how the lipids produce more

Hormone	Function	Answer
1. Antidiuretic Hormone	A. It stimulates the the growth and development of the male reproductive organs and promotes an increase in muscle mass and strength	1=
2. Cortisol		2=
3. Glucagon	B. It is needed to decrease the level of glucose in the bloodstream	3=
4. Progesterone	C. It is used to cause contraction of the <u>uterus</u> in order to <u>start labor</u> or <u>increase the speed of labor</u> , and to stop <u>bleeding following delivery</u>	4=
5. Prolactin	D. It stimulates the mammary glands to produce milk	5=
6. Oxytocin	E. It is needed to conserve body water by reducing the loss of water in urine	6=
7. Insulin	F. It stimulates the increase of the amount of glucose in the bloodstream and makes it easier for the brain to use glucose	7=
8. Testosterone	G. It is needed to decrease the level of glucose in the bloodstream	8=
	H. It encourages the endometrium to prepare for implantation and maintenance of pregnancy	

53. Fill in the blanks accordingly:

- A. The main biochemical processes by which fatty acids are completely oxidized and transformed into carbon dioxide and water by producing energy are
- B. is the biochemical process by which ketonic bodies are synthesized in the liver.
- C. is the process of the transfer of genetic information from mRNA to rRNA
- D. The biochemical process by which the molecules of acetyl-CoA which are not immediately used by the human body are stored is
- E. is a congenital metabolic disorder caused by the deficiency of the enzyme "phosphogalactose uridyl transferase".
- F. The process of the transfer of genetic information from DNA to mRNA is called

54. Define the term *vitamin*. Explain the physiological roles of the water soluble vitamins in the human body and explain the consequences linked to the deficiencies of those vitamins.

MCQs

55. The monomers for the nucleic acids are called _____
- Nitrogenous bases
 - Sugars
 - Pentose-phosphate group

- d. Nucleotides
56. Which of the following statements is TRUE for RNA molecule?
- a. Most RNA usually occurs in the cytoplasm while a very little RNA is found inside nucleus
 - b. RNA is usually double stranded with a unique polynucleotidic chain
 - c. RNA contains the genetic information
 - d. Purine and Pyrimidine bases in RNA are in equal number
57. The two polynucleotidic chains of DNA are linked together by:
- a. Covalent bond
 - b. Hydrogen bonds
 - c. Phosphodiester bond
 - d. Ionic bond
58. Inside a nucleic acid the nucleotides are joined by _____
- a. 1'- 4' phosphodiester bonds
 - b. 5'- 1' phosphodiester bonds
 - c. 3'- 5' phosphodiester bonds
 - d. 1'- 6' phosphodiester bonds
59. The term "metabolism" refers to _____
- a. the digestion of the food polymers into monomers
 - b. the synthesis of big molecules from simpler molecules.
 - c. the break down of big molecules into small molecules.
 - d. the anabolic and catabolic processes.
60. Nutritional polysaccharides are _____
- a. starch and glycogen
 - b. starch and chitin
 - c. starch and cellulose
 - d. starch and glucose
61. In the human body the glycogen molecules are mainly stored in _____
- a. liver and muscles
 - b. liver and pancreas
 - c. Muscles and bile
 - d. liver and adipose tissue
62. The association between the sugars and proteins makes _____
- a. glycolipids
 - b. glycoproteins
 - c. galactosides