Q.II. True or False? And correct the false. (10 marks)

1. ( ) Germ line cells and somatic cells are diploid (2n).

2. ( ) Synapsis, crossing over, and reduction of number of chromosomes occur during prophase I.

3. ( ) Translocation results when a segment of DNA breaks off, moves from one chromosome, and is inserted into its homologous chromosome.

4. ( ) In Na / K pump, three Na^+ pumping in the cell and two K^+ out.

5. (X) A general characteristic of cells is their microscopic size because as a cell grow, its surface area increases much faster than its volume does.

volume / / / / / / surface area / /

6. ( ) Glycoproteins and glycolipids act as surface markers that identify cell type.

7. ( ) Microfilaments are about 7 µm in diameter, while microtubules are about 25 µm in diameter.

8. ( ) Dyneins move organelles away from the nucleation center.

9. ( ) At spot desmosome, The plasma membranes of two adjacent cells are separated by a distance of 30 to 50 nm. And this desmosome joins actin filaments in one cell to a similar filaments in neighboring cell.

10. ( ) In counter transport, Na^+ enters the cell against its concentration gradient while Ca^{++} leaves the cell down its concentration gradient.

23. The primary structure of a protein is determined by

a. the hydrogen bonding in the molecule

b. The sequence of amino acids in the protein

c. The way amino acids coil around themselves

d. All of the above

24. The class of lipids that does not contain fatty acids is

a. triglycerides

b. steroids

c. phospholipids

d. waxes

25. Triglycerides are formed from their building units by

a. dehydration reactions

b. hydrolysis reactions

c. hydration reactions

d. oxidation reactions

26. In addition to their role as energy storage compounds, lipids are used to

a. make steroid hormones
b. make cell membrane components
c. support organs
d. make organs warm
e. all the above

27. What is the principal carbohydrate storage product in plants?

a. Starch
b. Glycogen
c. Cellulose
d. Glucose

Q.VI. What are the functions of the following (7 marks)

1. Smooth endoplasmic reticulum.

2. Cholesterol in plasma membrane of animal cells.

Cholesterol is a common component of animal cell membrane and also the precursor from which other steroids are synthesized

3. Peroxisomes

- detoxification of toxic substance alcohol
- $2H_2O_2 \longrightarrow 2H_2O + O_2$

Because H_2O_2 is danger in cell.

4. Microfilaments

[1] They responsible for cellular movement such as
. contraction of muscle
. crawling of white blood cell . pinching
[2] play role in determining the shape
[3] Because actin filaments can form and dissolve they enable some cells to change shape

5. Central vacuole

Store water, pigments, toxic
Pigments, intracellular digestion

3. Asexual reproduction and sexual reproduction

4. Spontaneous mutations and induced mutations

5. DNA replication and DNA transcription

6. Heterophagosomes and autophagosomes

28. In amylopectin, the glucose molecules are connected by

a. beta-1,4- glycosidic bonds
b. alpha-1,6-glycosidic bonds
c. alpha-1,4-glycosidic bonds
d. alpha-1,4-glycosidic bonds and alpha-1,6-glycosidic bonds

29. The mRNA in the cell

a. carries the genetic code from DNA to the ribosomes
b. carries amino acids to the ribosome for protein synthesis
c. combines with protein to form the ribosomes
d. all f the above

30. In a nucleotide, the nitrogenous base is attached to the sugar's _____ carbon and the phosphate group is attached to the sugar's _____ carbon.

a. 1' ... 2'
b. 1' ... 5'
c. 2' ... 3'
d. 1' ... 3'
e. 2' ... 1'

31. RNA molecule differs from a DNA molecule because

a. RNA is a single strand of nucleotides

b. RNA contains uracil

c. RNA contains ribose

d. All of the above

32. Why is the new DNA strand which is complementary to the 3' to 5' strands assembled in Okazaki fragments?

a. the replication forks prevent the formation of longer strands
b. DNA polymerase can assemble DNA only in the 3' to 5' direction
c. DNA polymerase can assemble DNA only in the 5' to 3' direction
d. All of the above

33. The cilia and flagella of eukaryotic cells are composed of _____.

a. microtubules
b. intermediate filaments
c. microfilaments
d. pili

17. ----- is non branched polymer of β-glucose.
a. Chitin
b. Cellulose
c. Amylose
d. Amylopectin
e. Glycogen

18. ------ is base substitution that result in change in amino acid.
a. Silent mutation
b. Nonsense mutation
c. Missense mutation
d. Frame-shift mutation

19. Which of the following statements concerning membrane proteins is incorrect?
a. They act as a channel, allowing the transport of ions across the membrane.
b. They may be receptor proteins.
c. They often require ATP to actively transport materials across the membrane
d. They are not specific.

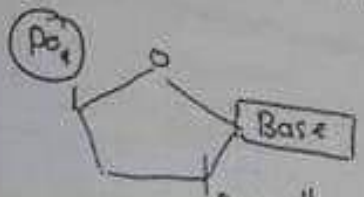
20. Which of the following processes uses a difference in concentration (or concentration gradient) to transport molecules across the cell membrane?
a. osmosis
b. simple diffusion
c. facilitated diffusion
d. all of the above

21. An essential amino acid is an amino acid that
a. must be provided in the diet
b. is missing from the diet
c. is synthesized in the body
d. all of the above

22. In the tertiary structure of hair, cross links between the R groups of cysteine are known as
a. disulfide bonds
b. hydrophilic attractions
c. ionic bonds
d. hydrogen bonds

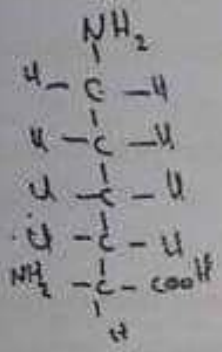
Q.VII. With drawing illustrate the following: (4 marks)

1. The structure of nucleotide

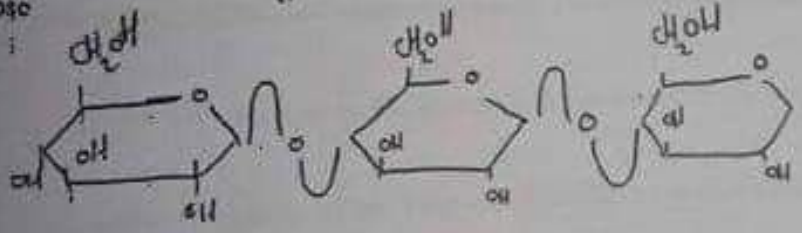


(RNA)
(DNA

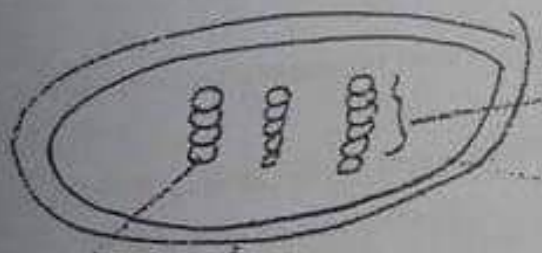
2. Lysine



3. Cellulose



4. Chloroplast



Q.III. Complete the following: (9 marks)

1. Lactose consists of glucose and galactose that joined by covalent bond called glycosidic bond

2. The intermediate filaments that occur in all types of muscle fibers composed of → ? protein called keratin protein

3. Tight junction attach epithelial cells to the basement membrane.

4. Meiosis is reduction division because _____

5. _____ is a specific nucleotide sequence of DNA where RNA polymerase binds and initiates transcription.

6. The first step in protein synthesis is the activation of amino acids by enzymes called _____

7. The type of animal ribosomes is 80S ribosomes. The S referrers to svedberg unit and it is defined as rate of sedimentation.

8. The ATP consists of 3 phosphate group, adenine and ribosome.

9. Pores in the cell wall of plant are called cellulose

10. DNA replication is semi-conservative, and this means it produces two copies that each contain one of original strand and one new.

11. During S phase, the centromere is bound to a disk of protein called _____. This disk functions as _____

12. fluorescence is the microscope that uses ultraviolet to illuminate specimens.

بسم الله الرحمن الرحيم

Al Azhar University-Gaza
Cell biology/Pharmacy
Time: 2 hours

Final exam.
1st semester 2009/2010
Student Name:----------

Answer all the following questions

Q.1. Choose the correct answer: (15 marks)

1. The chromosome that has only one arm is called
   a. telocentric chromosome
   b. acrocentric chromosome
   c. submetacentric chromosome
   d. metacentric chromosome

2. Which of the following causes the unwinding of the DNA double helix?
   a. DNA helicase
   b. RNA prime
   c. RNA polymerase
   d. DNA polymerase

3. The antiparallel nature of double-stranded DNA means that
   a. the two strands run from 5' to 3' in opposite direction.
   b. The 5' ends of the two strands are on the opposite ends of the DNA molecule.
   c. the two DNA strand twist around each other in a helical patter.
   d. (a and b)
   e. (a and c)

4. A protein that is composed of more than one polypeptide has
   a. primary structure
   b. secondary structure
   c. tertiary structure
   d. quaternary structure

5. In DNA replication, lagging strand is synthesized
   a. continuously in the 3' to 5' direction as a series of Okazaki fragments.
   b. continuously in the 5' to 3' direction as a series of Okazaki fragments.
   c. discontinuously in the 3' to 5' direction as a series of Okazaki fragments.
   d. discontinuously in the 5' to 3' direction as a series of Okazaki fragments.

Q.IV. Define (4 marks)

1. Codon:

2. Terpenes:

3. Plasmid:

4. Centrosome:

Q.V. What are the differences between the following: (8 marks)

1. Simple diffusion and facilitated diffusion:

2. Intermediate filaments and microfilaments

Intermediate	microfilament
8-10 nm	7 nm
once formed, they are considered permanent	they assemble and dissolve readily
subunits are fibrous proteins	subunits are globular

4. A protein that is composed of more than one polypeptide has
   a. primary structure
   b. secondary structure
   c. tertiary structure
   d. quaternary structure

5. How is water's high heat of evaporation beneficial to us?
   a. It allows us to cool by sweating
   b. It allows better temperature control inside cells
   c. It keeps cells from becoming hydrophobic
   d. It protects enzymes from rises in temperature which would deactivate them

6. Bacteria do not have
   a. ribosome
   b. a plasma membrane
   c. a true nucleus
   d. a genome.

7. Which of these does not require energy?
   a. simple diffusion
   b. osmosis
   c. facilitated diffusion
   d. all of the above

8. Decreasing of the cholesterol level in human blood is carried out by
   a. pinocytosis
   b. phagocytosis
   c. exocytosis
   d. receptor mediated endocytosis

9. Chromosomes replicate in
   a. prophase
   b. G_1 phase
   c. G_2 phase
   d. S phase

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a. ribosome b. a plasma membrane
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a. pinocytosis b. phagocytosis
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9. Chromosomes replicate in
a. prophase b. G_1 phase c. G_2 phase d. S phase

10. ___ anchor the nucleus and some organelles to their places in the cell.
a. Intermediate filaments b. Microtubules
c. Microfilaments d. Centrioles

11. The process by which the bacteria enter the cell is called
a. pinocytosis b. phagocytosis
c. exocytosis d. none of the above

12. ___ move the chromosomes in cell division.
a. Microtubules b. Intermediate filaments
c. Microfilaments d. Centrioles

13. Insulin is
a. transport protein b. structural protein c. contractile protein
d. regulatory protein e. none of the above

14. ___ is non branched polymer of β-glucose.
a. Chitin b. Cellulose c. Amylose
d. Amylopectin e. Glycogen

15. ___ is base substitution that result in change in amino acid.
a. Silent mutation b. Nonsense mutation
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11. The process by which the bacteria enter the cell is called
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    b. phagocytosis
    c. exocytosis
    d. none of the above

12. Which of the following types of transport does NOT require the use of a transport protein?
    a. both simple diffusion and facilitated diffusion
    b. facilitated diffusion
    c. active transport
    d. simple diffusion

13. What organelle processes and packages proteins before sending them through the cell
    a. Endoplasmic reticulum
    b. Ribosome
    c. Vesicle
    d. Golgi apparatus

14. Where are ribosomes produced?
    a. nucleus
    b. nucleolus
    c. nuclear envelope
    d. nucleoplasm

15. ----- move the chromosomes in cell division.
    a. Microtubules
    b. Intermediate filaments
    c. Microfilaments
    d. Centrioles

16. Insulin is
    a. transport protein
    b. structural protein
    c. contractile protein
    d. regulatory protein
    e. none of the above

11. ( ) The proteins which are sent to nucleus, mitochondria, and lysosomes are synthesized on free ribosomes and released to the cytoplasm.

12. ( ) Interleukin is a protein that stimulates the production of red blood cells.

13. ( ) The aim of mitosis in unicellular and multicellular organisms is reproduction.

14. ( ) The smooth endoplasmic reticulum is responsible has a role in blood glucose homeostasis.

15. ( ) Water contracts (get smaller) when it freezes, so it floats on the surface of liquid water

Q.2. Choose the correct answer: (45 marks)

1. The chromosome that has only one arm is called

a. telocentric chromosome
b. acrocentric chromosome
c. submetacentric chromosome
d. metacentric chromosome

2. The action of helicase creates _____.

a. primers and DNA fragments
b. primers and replication bubbles
c. DNA fragments and replication forks
d. replication forks and replication bubbles
e. DNA fragments and replication bubbles

3. The antiparallel nature of double-stranded DNA means that

a. the two strands run from 5' to 3' in opposite direction.
b. the 5' ends of the two strands are on the opposite ends of the DNA molecule.
c. the two DNA strand twist around each other in a helical patter.
d. (a and b)
e. (a and c)

بسم الله الرحمن الرحيم

Al Azhar University-Gaza
Cell biology/Pharmacy
Time: 2 hours

Final exam.
1st semester 2010/2011
Student Name:.....

Answer all the following questions

Q.1. True or False? And correct the false. (15 marks)

1. ( ) Germ line cells and somatic cells are diploid (2n).

2. ( ) Synapsis, crossing over, and reduction of number of chromosomes occur durjng prophase I.

3. ( ) Translocation results when a segment of DNA breaks off, moves from one chromosome, and is inserted into its homologous chromosome.

4. ( ) In Na / K pump, three Na^+ pumping in the cell and two K^+ out.

5. ( ) Insulin is made up of two polypeptide chains that are synthesized separately.

6. ( ) Microfilaments are about 7 µm in diameter, while microtubules are about 25 µm in diameter.

7. ( ) Dyneins move organelles toward the nucleation center.

8. ( ) The E site is the site on the small subunit of ribosome from where the tRNA leave the ribosome.

9. ( ) In counter transport, Na^+ enters the cell against its concentration gradient while Ca^{++} leaves the cell down its concentration gradient.

10. ( ) Somatic mutations are passed on to the daughter cells after mitosis.

3. Explain the composition of flagella with drawing. (2 marks)

Q. VI.26. What are the properties of cells of cancer?

1. Excessive proliferation.
2. They may have unusual numbers of chromosomes.
3. Their metabolism may be deranged, and they cease to function in any constructive way.
4. Due to abnormal changes of the cell's surfaces, they lose their attachments to neighboring cells and the extracellular matrix, and can spread into nearby tissues.

Q. VI.18: Explain osmoregulation of cells without walls and cells with walls.

Osmoregulation of cells without walls:

1. Seawater is isotonic to many marine invertebrates.

2. The cells of most terrestrial animals are bathed in an extracellular fluid that is isotonic to the cells.

3. Kidneys play a very large role in human osmoregulation, regulating the amount of water in urine waste. With the help of hormones the human body can increase the permeability of the collecting ducts in the kidney to reabsorb water and prevent it from being excreted.

4. Animals and other organisms without rigid cell walls living in hypotonic environments must have special adaptations for osmoregulation. For example, the protist paramecium lives in pond water, which is hypotonic to the cell. Water continually tends to enter the cell, but Paramecium has a plasma membrane that is much less permeable to water than the membranes of most other cells. Also, paramecium is equipped with a contractile vacuole, an organelle that forces water out of the cell as fast as it enters by osmosis.

Osmoregulation of cells with walls:

1. In higher plants the stomata are important in regulating water loss through evapotranspiration
2. On the cellular level the vacuole is crucial in regulating the concentration of solutes in the cytoplasm.
3. Other plants have leaf modifications to reduce water loss, such as needle-shaped leaves, sunken stomata, and thick, waxy cuticles as in the pines

15. Upward movement of water from roots of plants.
16. About two-thirds of any organism's body is composed of water.
17. Three-fourths of Earth's surfaces is covered by liquid water
18. Human and other vertebrates sweat
19. Keeping the food in a solution containing high salt concentration
20. Plant oils are liquid at room temperature.
21. Butter is solid at room temperature
22. Red blood cell has biconcave shape.

V. With drawing illustrate the following:

1. The structure of amino acid
2. The structure of nucleotide
3. Glucose (α and β)
4. Starch (amylose and amylopectin)
5. Maltose
6. Glycine
7. Alanine
8. Serine
9. Aspartic acid
10. Lysine
11. Cysteine
12. RNA
13. Ribose (ring form)
14. Deoxyribose (ring form)
15. Bacterial cell
16. The fluid mosaic model of the plasma membrane
17. Glycogen
18. Triglyceride (fat)
19. Cellulose
20. Chitin
21. DNA
22. Formation of peptide bond
23. Formation of phosphodiester bond
24. Glucose, fructose, and galactose (straight-chain form)

VI. Answer the following:

1. How can long DNA fiber coil tightly?
2. What is the cell theory?
3. What are the basic characteristics of all kinds of cells?
4. What are the properties of viruses?
5. Why are most cells microscopic?
6. What are the principles of phase contrast microscope and fluorescence microscope?
7. What is the important of electronic microscope?
8. How does the buffer in human blood work?
9. What are the functions of ions?
10. Write short note about:
    a. Denaturation of protein.
    b. Endospores of bacteria
11. Explain the steps of DNA replication (with drawing)
12. Explain the types of chromosomes according to site of the centromere
13. How do chromosomes play a major role in the determination of sex?
14. Endoplasmic reticulum acts as intracellular circulatory or transporting system. Explain with drawing.
15. What does happen when phospholipids and fats are placed in water?

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2009/2010

19. DNA polymerase I
20. DNA ligase
21. Cholesterol in plasma membrane of animal cells
22. Nuclear lamina
23. Endoplasmic reticulum (common functions of rough and smooth)
24. Rough endoplasmic reticulum
25. Smooth endoplasmic reticulum
26. Peroxisomes
27. Glyoxysomes
28. Ribosomes
29. Mitochondria
30. Centrioles
31. Microfilaments
32. Microtubules
33. Chloroplasts
34. Central vacuole

IV. Comment

1. Water is a polar compound.
2. Water is a powerful solvent
3. Table sugar is soluble in water
4. Small insects can walk on water
5. Upward movement of water from roots of plants
6. About two-thirds of any organism's body is composed of water.
7. Three-fourths of earth's surfaces is covered by liquid water
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7. Alanine
8. Serine
9. Aspartic acid
10. Lysine
11. Cysteine
12. RNA
13. Ribose (ring form)
14. Deoxyribose (ring form)
15. Bacterial cell
16. The fluid mosaic model of the plasma membrane
17. Glycogen
18. Triglyceride (fat)
19. Cellulose
20. Chitin
21. DNA
22. Formation of peptide bond
23. Formation of phosphodiester bond
24. Glucose, fructose, and galactose (straight-chain form)
25. ATP
26. Chloroplast
27. Plant cell
28. Animal cell

بسم الله الرحمن الرحيم

كلية الصيدلة
مستوى أول
Cell Biology أول

أسئلة مراجعة لطلبة الصيدلة-علم الخلية- المستوى الأول
الفصل الأول ٢٠٠٩/٢٠١٠- مدرس المادة /أ. منى وادي

Review Questions For Cell Biology For Pharmacy Students:

I. Define

1. Cell biology
2. Cell
3. Magnification
4. Resolving power
5. Cytoplasm
6. Cytosol
7. Chemical element
8. Primer
9. Centromere
10. Codon
11. Ions
12. Buffer
13. Blood acidosis
14. Blood alkalosis
15. Hydrophilic molecule
16. Hydrophobic molecules
17. Cohesion
18. Surface tension
19. Adhesion
20. Capillarity
21. Waxes
22. Terpenes
23. Steroids
24. Saturated fatty acid
25. Unsaturated fatty acid
26. Anticodon
27. Cytosol
28. Plasmid
29. Nucleoid
30. Nucleosome
31. Centrosome
32. Heterophagosomes
33. Autophagosomes
34. Autolysis
35. Plasmodesmata
36. Osmosis
37. Plasmolysis
38. Bulk transport
39. Growth factor
40. Transcription
41. Translation
42. Polysome

II. What are the differences between the following:

1. Fats and oils
2. DNA and RNA
3. Chromosome and Chromatin
4. Primary and secondary lysosomes
5. Prokaryotes and eukaryotes

19. What happen when red blood cells and plant cells put in hypertonic and hypotonic solutions?

20. What is the importance of active transport?

21. Explain the process by which the cholesterol level in human blood is decreased. With drawing.

22. What is the importance of cell division?

23. Explain phases of mitosis with drawing.

24. Explain the three checkpoints that control the cell cycle in eukaryotes.

25. For an animal cell to divide, nutrients are not enough, it must also receive chemical signals from other cells that stimulate other cells to divide. Explain.

26. What are the properties of cells of cancer?

27. What are the unique features of meiosis?

28. Explain the phases of meiosis (meiosis I and meiosis II) with drawing.

29. What are the types of RNA and their functions?

30. The polypeptide chain that is released from the ribosome may need to be moved far from the site of synthesis in the cytoplasm, moved into an organelle, or even secreted from the cell. Explain how does the polypeptide chain determine its destination.

32. Explain types of point mutations.

33. Explain types of chromosomal mutations.

34. Explain steps of transcription.

35. Explain steps of translation.

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2009/2010

2. They involved in cell movement (such as contraction of muscle cells, crawling of white blood cells and formation of cellular extensions).
3. They consist of single type of proteins (actin).
4. Their subunits are globular.

Q.II.14. Intermediate filaments and microtubules

Intermediate filaments

5. Once formed, they are stable and usually do not break down.
6. Not involved in cell movement
7. They consists of several types of proteins (such as nuclear lamina, keratin and desmin).
8. Their subunits are elongated.

Microtubules

5. They assemble and disassemble readily.
6. They involved in cell movement (such as movement of chromosomes in cell division).
7. They consist of single type of proteins (tubulin).
8. Their subunits are globular.

Q.II.17. Cell wall of plants and cell wall of fungi

Plant cell walls contain cellulose that is embedded in a matrix of proteins and other carbohydrates.

The cells of fungi have cell walls composed of chitin fibers embedded in a matrix of other polysaccharides and proteins.

Q.II.29. DNA replication and DNA transcription

DNA replication: It needs primer. The two strands of DNA are replicated (two strands of DNA act as templates strands). All the DNA molecule is replicated. The result is production of two identical molecules of DNA.

DNA transcription: It doe not need primer. For each gene, only one of the two DNA strands is transcribed (one strand acts as template strand). Not all DNA molecule is transcribed (some genes). The result is production of RNA molecule.

Primary structure: It is the linear sequence of amino acids linked by peptide bonds. The primary structure of protein is determined by nucleotide sequence of gene that encodes the protein. Primary structure determines all higher levels

2. Secondary structure: It is due to the interaction of the peptide bond with nearby neighbors by hydrogen bonds. It may be α-helix or β-pleated sheets and this according to the orientation of hydrogen bonds. Alpha helix is a coil held together by hydrogen bonding between every fourth amino acid. In the pleated sheet, two regions of the polypeptide chain lie parallel to each other.

Tertiary

Q.II.7. Tertiary and quaternary structures of proteins

1. Tertiary structure: Polypeptide chain consists of folding and twisting in addition to α-helix and β-pleated sheets. And these different portions can interact to form more globular structure. And this due to the interaction between side groups. Types of interaction between side groups (R-groups) of amino acids are: Disulfide bonds (S-S), van der waals bonds, hydrogen bonds, ionic bonds and hydrophobic interaction.

2. Quaternary structure: When two or more polypeptide chains associate to form a functional protein, the chains are referred to as subunits of protein. Each of them folded into its own tertiary structure. The protein's quaternary structure results from the way in which these subunits bind together and interact by hydrogen, ionic, disulphide and hydrophobic interaction. Such as hemoglobin is quaternary structure that is made of 4 protein subunits (2 alpha chains and 2 beta chains).

Q.II.13. Intermediate filaments and microfilaments

Intermediate filaments

1. Once formed, they are stable and usually do not break down.
2. Not involved in cell movement
3. They consists of several types of proteins (such as nuclear lamina, keratin and desmin).
4. Their subunits are elongated.

Microfilaments

1. They assemble and disassemble readily.

Q.IV.1. Water is a polar compound.

In water molecule, H_2O, the hydrogen and oxygen atoms share electrons to form covalent bonds. The oxygen atom is more electronegative than the hydrogen atoms, so it attracts the electrons more strongly than do the hydrogen atoms. As a result, the shared electrons in water molecule are far more likely to be found near the oxygen nucleus than near the hydrogen nuclei. This stronger attraction for electrons gives the oxygen atom two partial negative charges (δ^-) and each hydrogen atom carries a partial positive charge (δ^+).

Q. IV.2. Water is a powerful solvent

because of its ability to form hydrogen bonds. Water molecules gather closely around any substance that bears an electrical charge, whether that substance carries a full charge (ion) or partial charge (polar molecule).

Q.IV.3. Table sugar is soluble in water

Table sugar (sucrose) is composed of molecules that contain slightly polar hydroxyl (OH) groups. A sugar crystal dissolves rapidly in water because water molecules can form hydrogen bonds with hydroxyl groups of the sucrose molecules.

Q.IV.9. Keeping the food in a solution containing high salt concentration

Because high salt make denaturation for the enzymes of microorganisms and kept them from growing on the food.

Q.IV.4. Small insects can walk on water

The cohesion forces in water resulting from hydrogen bonds cause the molecules at the surface of water to be pulled downward into the liquid (**surface tension**). As a result water acts as if it has a thin skin on its surface.

Q. IV.10. Plant oils are liquid at room temperature.

Plant oils contain unsaturated fatty acid that contain one or more double bonds The double bonds produce kinks in the fatty acid chains that prevent the fats from packing close together.

Q.II.6. Primary and secondary structures of proteins

6. Primary and secondary structures of proteins
7. Tertiary and quaternary structures of proteins
8. Bright field microscope and dark field microscope
9. Transmission electron microscope and scanning electron microscope
10. Saturated fatty acids and unsaturated fatty acids.
11. leading strand and lagging strand of DNA.
12. Heterophagosomes and autophagosomes
13. Intermediate filaments and microfilaments
14. Intermediate filaments and microtubules
15. Flagella and cilia
16. Cell wall of bacteria and cell wall of plant cells.
17. Cell wall of plants and cell wall of fungi
18. Passive and active transport
19. Simple diffusion and facilitated diffusion
20. Co-transport and counter transport
21. Endocytosis and exocytosis
22. Phagocytosis and pinocytosis
23. Cytokinesis in plant and animal cells.
24. Benign tumor and malignant tumor.
25. Asexual and sexual reproduction
26. Somatic mutations and germ line mutations
27. Point mutations and chromosomal mutations
28. Spontaneous mutations and induced mutations
29. DNA replication and DNA transcription

III. What are the functions of the following

1. O, C, H, N, Ca, P, K, S, Na, Fe
2. Proteins
3. Plasmids
4. Pili
5. Capsule
6. Plasma membrane
7. Membrane proteins
8. Nucleus
9. Nucleolus
10. Rough endoplasmic reticulum
11. Smooth endoplasmic reticulum
12. Golgi apparatus
13. Lysosomes
14. Fats
15. Helicase enzyme
16. Single strand binding protein
17. Primase enzyme
18. DNA polymerase III

Q.VI. What are the functions of the following (7 marks)

1. Smooth endoplasmic reticulum.

2. Cholesterol in plasma membrane of animal cells.

Cholesterol is a common component of animal cell membrane and also the precursor from which other steroids are synthesized

3. Peroxisomes

- detoxification of toxic substance alcohol
- $2H_2O_2 \longrightarrow 2H_2O + O_2$

Because H_2O_2 is danger in cell.

4. Microfilaments

[1] They responsible for cellular movement such as
. contraction of muscle
. crawling of white blood cell . pinching
[2] play role in determining the shape
[3] Because actin filaments can form and dissolve they enable some cells to change shape

5. Central vacuole

Store water, pigments, toxic
Pigments, intracellular digestion

Answers of some questions

Q.VI. 31. The polypeptide chain that is released from the ribosome may need to be moved far from the site of synthesis in the cytoplasm, moved into an organelle, or even secreted from the cell. Explain how does the polypeptide chain determine its destination

All protein synthesis begins on free ribosomes in the cytoplasm. As a polypeptide chain is made, the information contained in its amino acid sequence gives it one of two :

1. **Finish translation** and be released to the cytoplasm. Such proteins are sent to the nucleus, mitochondria, plastids, or peroxisomes, depending on **signal sequences** or tacking these signals so they remain in the cytosol. The signal sequences have a conformation that allows them to bind to specific receptor proteins on the outer membrane of the appropriate organelle. Once the protein has bound to it, the receptor forms a channel in the membrane, allowing the protein to pass through to its organelle destination.

2. **Stop translation**, go to the endoplasmic reticulum (ER), and finish synthesis there. In the cytoplasm, before translation is finished, the signal sequence binds to a signal **recognition particle**. This binding blocks further protein synthesis until the ribosome can become attached to a specific receptor protein in the membrane of the rough ER. Once again, the receptor protein is converted into a channel, through which the growing polypeptide passes. After protein synthesis is completed, such proteins may be retained in the ER or sent to lysosomes via the Golgi apparatus, or they may be sent to the plasma membrane, or they are secreted from the cell via vesicles.

Q.VI. 25. For an animal cell to divide, nutrients are not enough, it must also receive chemical signals from other cells that stimulate other cells to divide. One example of a growth factor is platelet-derived growth factor (PDGF), which is made by blood cells called platelets. When an injury occurs, platelets release PDGF in the vicinity for wound healing. PDGF is required for the division of fibroblasts that helps heal the wound. Fibroblasts have PDGF receptors on their plasma membranes. The binding of PDGF molecules to these receptors leads to stimulation of cell division.

10. ----- anchor the nucleus and some organelles to their places in the cell.
    a. Intermediate filaments
    b. Microtubules
    c. Microfilaments
    d. Centrioles

11. The process by which the bacteria enter the cell is called
    a. pinocytosis
    b. phagocytosis
    c. exocytosis
    d. none of the above

12. Which of the following types of transport does NOT require the use of a transport protein?
    a. both simple diffusion and facilitated diffusion
    b. facilitated diffusion
    c. active transport
    d. simple diffusion

13. What organelle processes and packages proteins before sending them through the cell
    a. Endoplasmic reticulum
    b. Ribosome
    c. Vesicle
    d. Golgi apparatus

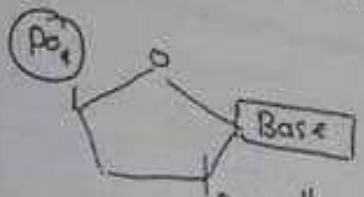
14. Where are ribosomes produced?
    a. nucleus
    b. nucleolus
    c. nuclear envelope
    d. nucleoplasm

15. ----- move the chromosomes in cell division.
    a. Microtubules
    b. Intermediate filaments
    c. Microfilaments
    d. Centrioles

16. Insulin is
    a. transport protein
    b. structural protein
    c. contractile protein
    d. regulatory protein
    e. none of the above

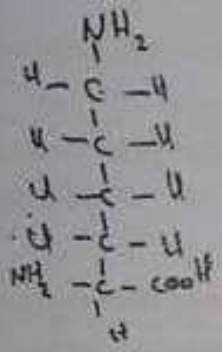
Q.VII. With drawing illustrate the following: (4 marks)

1. The structure of nucleotide

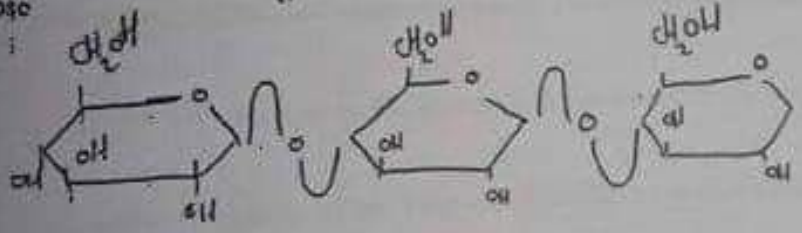


(RNA)
(DNA

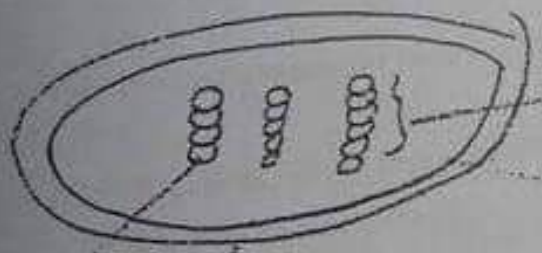
2. Lysine



3. Cellulose



4. Chloroplast



17. ----- is non branched polymer of β-glucose.
a. Chitin
b. Cellulose
c. Amylose
d. Amylopectin
e. Glycogen

18. ------ is base substitution that result in change in amino acid.
a. Silent mutation
b. Nonsense mutation
c. Missense mutation
d. Frame-shift mutation

19. Which of the following statements concerning membrane proteins is incorrect?
a. They act as a channel, allowing the transport of ions across the membrane.
b. They may be receptor proteins.
c. They often require ATP to actively transport materials across the membrane
d. They are not specific.

20. Which of the following processes uses a difference in concentration (or concentration gradient) to transport molecules across the cell membrane?
a. osmosis
b. simple diffusion
c. facilitated diffusion
d. all of the above

21. An essential amino acid is an amino acid that
a. must be provided in the diet
b. is missing from the diet
c. is synthesized in the body
d. all of the above

22. In the tertiary structure of hair, cross links between the R groups of cysteine are known as
a. disulfide bonds
b. hydrophilic attractions
c. ionic bonds
d. hydrogen bonds