

BIO TEST BANK FOR 2021 DOCTORES

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1.all of the following properties makes water an essential substance for life on earth except:

- A .solvent
- B. cohesion
- c. expansion above 10 c degree
- d. surface tension
- e. specific heat

answer C

2. which of the following properties is shared by starch & cellulose?

- a. polymer of glucose
- b. digested by humans
- c. none of the option is correct
- d. structural carbohydrates
- e. branched carbohydrates

answer A

3. the four main categories of macromolecules in a cell are :

- a. proteins , nucleic acids , carbohydrates and lipids
- b. monosaccharides , lipids , polysaccharides and proteins
- c. proteins, DNA , RNA and steroids
- d. nucleic acids , carbohydrates , monosaccharides and proteins
- e. RNA, DNA , proteins and carbohydrates

answer A

4. how does DNA differ from RNA ?

- a. they contain different sugars
- b. all of the options are correct
- c. none of the option is correct
- d. one of their nitrogenous bases is different
- e. DNA is larger

ANWER /b

5. the tertiary structure of proteins refers to :

- a. folding due to interactions between R groups of the amino acids
- b. the weak interaction of two or more polypeptides
- c. coiling due to hydrogen bonding between atoms of backbone
- d. the sequence of amino acids
- e. the alpha helix and beta pleated sheets

Answer: A

6. phospholipids function in animal cells as :

- a. enzymes
- b. vertebrate hormones
- c. a component of triglycerides
- d. energy storage molecules
- e. a component of the membranes

Answer: E

7. which of the following is not a polymer

- a. collagen
- b. starch
- c. phospholipid
- d. cellulose
- E. RNA

Answer: C

8. thylakoids, DNA and ribosomes are all components found in

- a. nuclei
- b. mitochondria
- c. vacuoles
- d. lysosomes
- e. chloroplasts

Answer: E

9. large numbers of ribosomes are present in cells that specialize in producing which of the following molecules ?

- a. proteins
- b. cellulose
- c. lipides
- d. nucleic acids
- e. glycogen

Answer: A

10. The most likely pathway taken by a newly synthesized protein that will be secreted by a cell is to go from ER to Golgi, then from Golgi in Vesicles to fuse with plasma membrane

- A. true
- b. false

Answer: A

11. the structural level of a protein least affected by disruption in hydrogen bonding is the :

- a. all are equally affected
- b. secondary
- c. primary
- d. quaternary
- e. tertiary

Answer: C

12. the monomers of nucleic acids are

- a. pyrimidine
- b. nucleoside monophosphate
- c. nucleotides
- d. purine
- e. nucleoside monophosphate or nucleotides

Answer: e

13. chromosomes are a complex of proteins and DNA or RNA

- a. true

b. false

Answer: b

14. microtubules are hollow tubes, consists of columns of tubulin molecules:

a. true

b. false

Answer: A

15. you would expect a cell with an extensive Golgi apparatus to :

a. secrete a lot of material

b. store large a mount of food

c. perform photosynthesis

d. move actively

e. make a lot of ATP

Answer: A

16. the maximum magnification in the light microscope is 1000 times

a. true

b. false

Answer:a

17. which of the following is made of 1-4 linkage of beta glucose monomers :

a. glycogen

b. sucrose

c. cellulose

d. maltose

e. starch

Answer: C

18. steroid hormones such as testosterone and estrogen are derived from :

a. none of the options is correct

b. triacylglycerol

c. glycolipids

d. saturated fatty acids

e. cholesterol

Answer: E

19. Specific heat of water molecule contribute to the following, except :

- A. Ice floating on top of fluid water
- B. None of the choices
- C. organisms resist changes in body temperature
- D. Stabilize ocean temperatures
- E. high heat of vaporization for water

Answer: A

20.If an individual has abnormal microtubules, then his sperms and skeletal muscles will be affected

- A. True
- B. False

Answer: b

21.The sphere of water molecules around each dissolved ion is called a hydration shell.

- A. True
- B. False

Answer: A

22.A certain cell has mitochondria, ribosomes smooth and rough ER, and other parts, It could not be

- A. a bacterium
- B. a grasshopper cell
- C. a yeast (fungus) cell
- D. a human cell
- E. a plant cell

Answer: A

23.All of the following are correct about a polypeptide molecule except

- A. It is a branched polymer
- B. Each type has a unique sequence of amino acids
- C. Monomers are linked by peptide bonds
- D. Formed by dehydration reactions

E. Has polarity with N-terminus and C-terminus

Answer: A

24. Which of the following is correct regarding monomers and polymers?

A. None of the options is correct

B. Hydrolysis creates polymers and dehydration reactions break down polymers

C. Monomers are built from many identical building blocks linked by covalent bonds

D. Dehydration reactions assemble monomers and hydrolysis reactions break down polymers

E. All of the options are correct

Answer: D

25. All of the following materials are hydrophilic except

A. Unsaturated fat

B. Lactose

C. NaCl

D. Starch

E. Cellulose

Answer: A

26. Microtubules control the beating of cilia and flagella which aid in cell motility in some unicellular organisms .

A. True

B. False

Answer: A

27. What types of proteins are not synthesized in the rough ER?

A. extracellular matrix proteins

B. plasma membrane proteins

C. endoplasmic reticulum proteins

D. mitochondrial proteins

E. secretion proteins

Answer: D

28. What technique would be most appropriate to use to observe the movements of condensed chromosomes during cell division?

- A. super-resolution fluorescence microscopy
- B. confocal fluorescence microscopy
- C. transmission electron microscopy
- D. light microscopy
- E. scanning electron microscopy

Answer: d

29. A plant cell was grown in a test tube with radioactive nucleotides, from which DNA is built, the radioactivity will be concentrated in the Rough ER

- A. True
- B. False

Answer: B

30. Sickle-cell hemoglobin differs from normal hemoglobin by replacement of glutamic acid, the sixth amino acid in the Alpha-chain, by valine

- A. True
- B. False

Answer: B

31. Cytochalasin D is a drug that prevents actin polymerization. A cell treated with cytochalasin D will still be able to contract muscle fibers.

- A. False
- B. True

Answer: A

32. Which plant cell organelle contains its own DNA and ribosomes?

- A. mitochondrion
- B. glyoxysome
- C. peroxisome
- D. vacuole
- E. Golgi apparatus

Answer: A

33. What makes one amino acid different from another?

- A. Different R groups attached to a carboxyl carbon
- B. Different R groups attached to amine group
- c. Different R groups attached to on Alpha carbon
- D. All options are correct
- E. Different asymmetric carbon

Answer: C

34. The electron microscope has been particularly useful in study of bacteria because

- A. Bacteria have few organelles
- B. Electrons can pass through bacterial cell wall
- C. Bacteria move so quickly
- D. Their organelles are small and packed together tightly
- E. Bacteria is so small

Answer: E

35. Proteins are involved in all of the following except

- A. Compact energy storage
- B. Transport
- C. Enzymes
- D. Signal receptor
- E. Body defense

Answer: A

36. Movement of vesicles within the cell depends on what cellular structure ?

- a. Actin filaments and microtubules
- b. centrioles and motor proteins
- c. actin filaments and intermediate filaments
- d. actin filaments and ribosomes
- e. microtubules and motor proteins

Answer: E

37. bacterial cells are prokaryotic in comparison to a typical eukaryotic cell they :

- a. lack a nucleus
- b. their organelles are small and packed together
- c. have fewer internal membranous compartments
- d. have a smaller nucleus
- e. lack of plasma membrane

Answer: A

38. cellulose is ..... made of many .....

- a. carbohydrates/fatty acids
- b. polymer/glucose molecules
- c. lipid / triglycerides
- d. protein / amino acids
- e. polypeptides/ monosaccharide

Answer: B

39. Hydrogen bonds between water molecule is responsible for the following properties of water, except.

- A. Cohesion
- B. Surface tension
- C. Specific heat
- D. All of the choices
- E. Polarity

Answer: E

40. Ions can travel directly from the cytoplasm of one animal cell to the cytoplasm of an adjacent cell through :

- A. tight junctions.
- B. plasmodesmata.
- C. gap junctions.
- D. intermediate filaments.
- E. desmosomes

Answer: C

41. For a protein to have a quaternary structure it must have four polypeptide subunits

- A. False
- B. True

Answer: A

42. Cohesion helps the transport of water against gravity in plants

- A. False
- B. True

Answer: B

43. Which one of the following statement is incorrect?

- A None of the choices
- B. 1 cal equal 4,184 J
- C. To evaporate 1 g at water at 25c, about 580 cal of heat is needed
- D. A hydrophilic substance is one that does not have an affinity for water
- E. Water reaches its greatest density at 4 c degree

Answer: D

44. ECM proteins are made by ribosomes associated with rough ER

- a. true
- b. false

Answer: A

45. A cell with a predominance of free ribosomes is most likely.

- A. enlarging its vacuole
- B. producing primarily cytoplasmic proteins
- C. digesting large food particles
- D. constructing an extensive cell wall
- E. producing primarily proteins for secretion

Answer: B

46. Denaturation causes changes in the protein's confirmation by disrupting

- A. Hydrogen bonds

- B. Ionic bonds
- C. Hydrophobic interactions
- D. All of the options are correct
- E. Disulfide bonds

Answer: D

47. Dehydration and hydrolysis reactions involve removing or adding of to macromolecule subunits

- A. OH and H
- B. COOH and H
- C. C and O
- D. H and C
- E. CH and NH<sub>2</sub>

Answer: A

48. Nucleotides contain..... sugars

- A. six-carbon
- B. three-carbon
- C. five-carbon
- D. seven-carbon
- E. four-carbon

Answer: C

49. Polarity allows water molecules to form hydrogen bonds

- A. False
- B. True

Answer: B

50. You would like to film movement of chromosomes during cell division. Your best choice for a microscope would be a :

- A. light microscope, because the specimen is alive
- B. Transmission electron microscope, because of higher magnification
- C. Scanning electron microscope
- D. Transmission electron microscope, because of higher resolving power

E. Light microscope, because of its resolving power

Answer: A

51. Which type of organelle or structure is primarily involved in the synthesis of oils, phospholipids, and steroids?

A. mitochondrion

B. smooth endoplasmic reticulum

C. lysosome

D. contractile vacuole

E. ribosome

Answer: B

52. The extracellular matrix is thought to participate in the regulation of animal cell behavior by communicating information from the outside to the inside of the cell via integrins

A. True

B. False

Answer: A

53. The unfolding of a protein induced by heat or treatment with certain chemicals is referred to

A. Polymerization

B. Renaturation

C. Digestion

D. Denaturation

E. Activation

Answer: D

54. Which organelle is the primary site of ATP synthesis in eukaryotic cells?

A. mitochondrion

B. vacuole

c. Golgi apparatus

D. lysosome

E. peroxisome

Answer: A

55. What makes a fatty acid an acid?

- A. Its carboxyl group
- B. Its insolubility in water
- C. Its hydrocarbon skeleton
- D. Being a polymer
- E. Its ability to form an ester bond

Answer: A

56. Organic compounds, that are composed of carbon, hydrogen, and oxygen in a 1:2:1 ratio are called:

- A. Nucleotides
- B. Proteins
- C. nucleic acids
- D. Sugars
- E. Fatty acids

Answer: D

57. Motor proteins provide for molecular motion in cells by interacting with what types of cellular structures?

- A. ribosomes
- B. cytoskeletal structures
- C. membrane proteins
- D. cellulose fibers in the cell wall
- E. sites of energy production in cellular respiration

Answer: B

58. Which of the following is true regarding saturated fatty acids

- A. Are the principal molecules in butter
- B. Have double bonds between their carbon atoms
- C. Are liquid at room temperature
- D. All of the options are true

E Are the predominant fatty acids in corn oil

Answer: A

59. Both DNA and RNA have the same pentose

A. False

B. True

Answer: A

60. phagocytic white blood cells are the best for studying lysosomes

A. True

b. False

Answer: A

61. How much heat must be absorbed by 10 grams of water to raise its temperature by 5° C? (Specific heat of water ~ 4 J)

Select one:

A. 200 J

B. 40 J

C. 4J

D. 1000 J

E. 500 J

Answer: A

1) The specific heat of water is :

A.5 Cal per g per C

B.2 Cal per g per C

C.3 Cal per g per C

D.1 Cal per g per C

2) The specific heat of water is

A.High

B.Low

C.Moderate

D. None of above

3) The sphere of water molecule around an ions is known as

A. Hydration shell

B. Cohesion

C. Adhesion

D. Surface tension

4) Each water molecules can form hydrogen bond with other ———molecules

A. 4

B. 3

C. 2

D. 1

5) Ice floats above liquid water because

A. Ice is less dense than water

B. Liquid water is less dense than water

C. Both of liquid water and ice have same density

D. A+C

E. None of the above

6) some evaporation can occur at———

A. High temperature

B. Low temperature

C. Any temperature

D. At 100C

E. None of the above

7) Describe water's heat of vaporization

A. High

B. Low

C. Moderate

D. It has none

E. All of the above

8) when water vaporizes , which of the following bonds must be broken

- A.Ionic
- B.Polar covalent
- C.Hydrogen bond
- D.Hydrophobic
- E.None of the above

9) which the following is not property of liquid water

- A.Ice has a lower density than liquid water
- B.Liquid water has high surface tension
- C.Can form hydrogen bond with other water molecules
- D.Has low specific heat
- E.None of the above

10) Most important reason for unusual properties of water is

- A.The covalent bonding pattern-in water molecules
- B.The bond angle between two hydrogen atoms in the molecule
- C.Hydrogen bonding between water molecules
- D.None of the above
- E.All of the above

11) The property that can make water resistant to changing in its temperature

- A.High surface tension
- B.High specific heat
- C.High heat of evaporation
- D.Its V shape
- E.Covalent bond between water molecules

12) In aqueous solution , the solvent is ---

- A.Water chloroform
- B.Ether
- C.All of the above
- D.None of the above

13) which of the following classified as hydrophilic molecules but cannot dissolve in water

A.Cellulose

B.Cotton

C.Oil

D.Salt

E.A+ B

14) Which of the following helps in the transporting of water against gravity

A.Cohesion

B.Adhesion

C.Evaporation

D.Condensation

E.All of them except D

15) Hydration shell can be form around

A.Ion

B.Sugar

C.Oil

D.Glucose

E.All of them except C

16) which of the following is true about electronegativity of oxygen and hydrogen

A.Hydrogen is more electronegative than oxygen

B.Oxygen is more electronegative than hydrogen

C.Oxygen and hydrogen have the same electro negativity

17) which the following is hydrophobic material

A.Paper

B.Salt

C.Wax

D.Sugar

E.Pasta

18) Transformation of material from liquid to gaseous state is known as

A.Evaporation

B.Vaporization

C.Boiling

D.Condensation

E.A+B

19) The tendency of water molecules to stay close to each other as a result hydrogen bonding

A.Acts to moderate temperature

B.Keeps water moving through the vessels in tree trunk

C.Is called cohesion

D.Provide the surface tension that allows leaves to float on water

E.All of the listed responses are correct

20) The oxygen atom in a water molecule due to its high electronegativity

A.One negative charge

B.Two negative charges

C.One positive charge

D.Two positive charges

E.None of the above

21) Hydrogen bond is

Attraction between hydrogen and electronegative atom

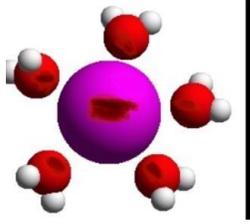
22) What is specific heat

A.The temperature it takes to raise 1g of a substance by 1 degree C

B.The temperature it takes to raise 1g of a substance by 1 degree F

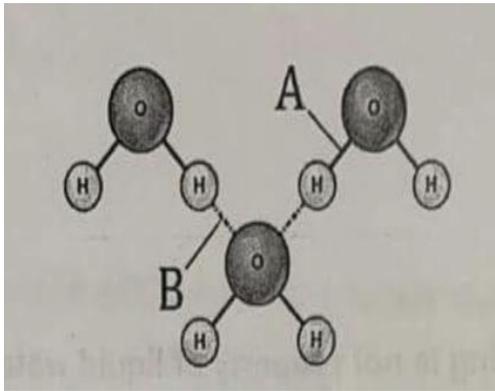
C.The temperature in Celsius to boil 1g of substance at boiling point

23) Based on your knowledge of the polarity of water molecules, the solute molecules depicted here is most likely.

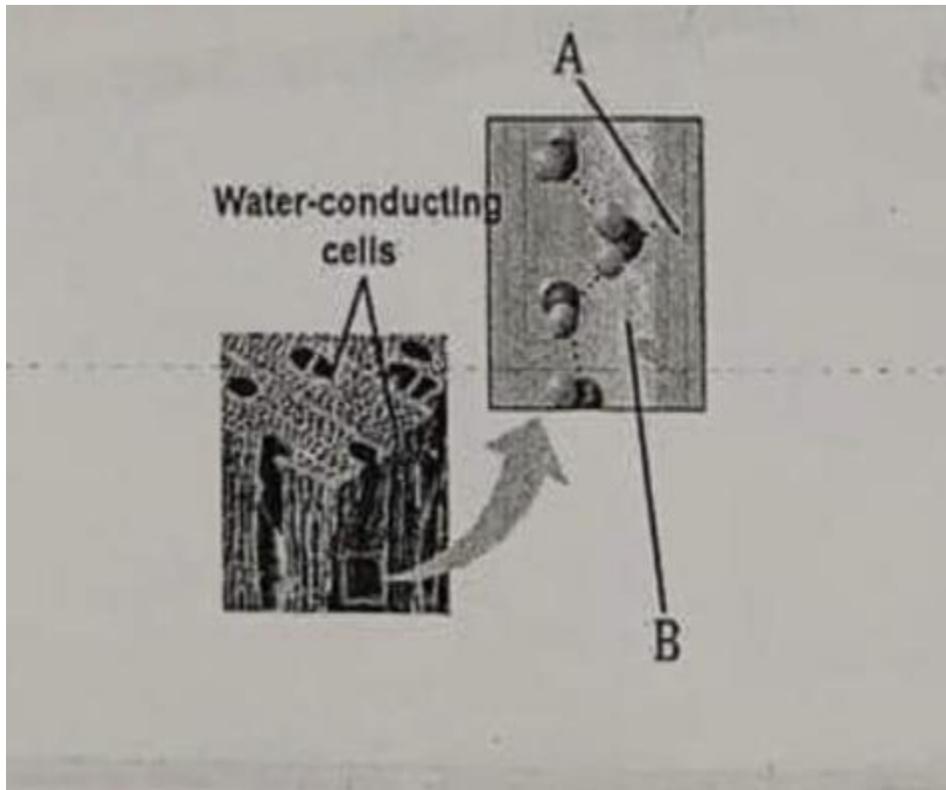


- A. Positively charged
- B. Negatively charged
- C. Whiteout charged
- D. None polar

24) According to the figure A represent ——— bond while B represent ——— bond



25) According to the figure which letters represent adhesion and which represent cohesion?



26) When water vaporizes, which of the following bonds is broken

- A. Ionic
- B. Hydrogen
- C. Polar covalent
- D. Non polar covalent

Answers

- 1. D) 1 cal per g per C
- 2. A) High
- 3. A) Hydration shell
- 4. A) 4
- 5. A) Ice is less dense than water
- 6. C) At any temperature
- 7. A) High

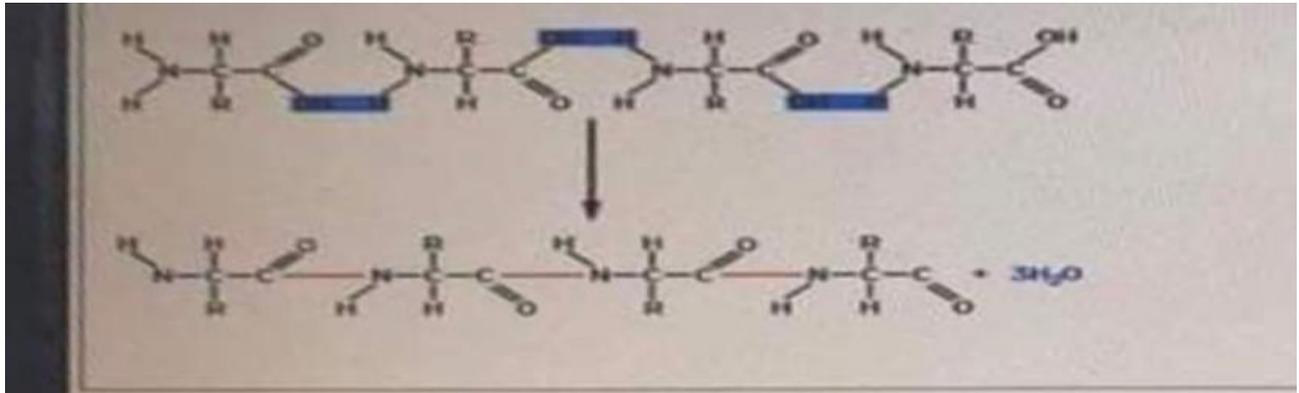
8. C)Hydrogen bond
9. D)Has low specific heat
10. C)Hydrogen bonding between water molecules
11. B)High specific heat
12. A)Water
13. E)B+ A
14. E)All of them except D
15. E)All of them except C
16. B)Oxygen is more electronegative than hydrogen
17. C)Wax
18. E)A+B
19. E)All of the listed responses are correct
20. B)Two negative charges
21. Answered
22. A.The temperature it takes to raise 1g of a substance by 1 degree C
23. Positively charged
24. A)polar. B)hydrogen bond
25. A) Adhesion. B)Cohesion
26. B)Hydrogen bonds \*\*

تشق الدروب اليك يا رب، موقنين أنها خضراء نضرة، راجيين أن تحصد أقدامنا حبك وقبولك، آملين"

"أل يمسننا نصب ول تقل عزيمتنا

Chapter (5): Biological macromolecules

1. What are formed in the reaction shown



A. Ester bond

B. Peptide bond

C. hydrogen bond

D. ionic bond

2. Sulfur can be found in:

A. Proteins

B. Starch

C. DNA

D. Cholesterols

E. Fats

3. All of the following considered as lipids except of

A. Fats

B. Phospholipids

C. Some waxes

D. Cholesterols

E. All of them are lipids

4. The sugar that have nitrogen containing appendage in their monomer

A. Cellulose

B. Starch

C. Glycogen

D. Chitin

5. Insoluble fibers is

- A. Carbs
- B. Cellulose
- C. Starch
- D. Glycogen
- E. A + B

6. Disulfide bridge can stabilize \_\_\_\_\_ structure of protein

- A. Primary
- B. Secondary
- C. Tertiary
- D. Quaternary
- E. All of the above

7. Which of the following doesn't contain amino acids

- A. Hemoglobin
- B. Collagens
- C. Enzymes
- D. RNA
- E. Insulin

8. Which of the following doesn't contain true polymer?

- A. Protein
- B. Carbs
- C. Lipids
- D. DNA
- E. RNA

9. Lipids are a group of molecules that \_\_\_\_\_

- A. Contain peptide bonds
- B. Mix poorly with water
- C. Contain polar parts
- D. All of the above

E. A + B

10. How many water molecules needed to hydrolyze a polymer made of 4 monomers

A. 4

B. 3

C. 2

D. 1

11. In order to synthesize one fat molecule, the dehydration reaction needs remove \_\_\_\_\_ water molecules

A. 3

B. 4

C. 5

D. 6

12. Secondary structure of protein form by hydrogen bonding between \_\_\_\_\_

A. Backbone

B. Side chain

C. R group

D. Amino groups

E. None of the above

13. Which of the following is "Storage carbs in plant

A. Starch

B. Cellulose

C. Glycogen

D. Chitin

E. Insulin

14. Enzymes are usually \_\_\_\_\_

A. Carbs

B. Fats

C. Nucleic acid

D. Monosaccharides

E. Protein

15. Animals store glucose in the form of which macromolecule

A. Amylose

B. Glycogen

C. Glycerol

D. Cellulose

16. Which of the following is true about globular proteins

A. It's hydrophilic amino acids can be found at the surface

B. It's hydrophilic amino acids can be found in the core

C. It's hydrophobic amino acid can be found at the surface

D. It's hydrophobic amino acid can be found in the core

E. A + D

17. Which of the following is mismatched

A. Polypeptide =peptide bond

B. Fats= ester bond

C. Carbs= glycosidic linkage

D. All of them are correct

18. Which of the following is true about DNA

A. It's 5 end contains OH

B. It's 3 end contains phosphate group

C. It contains ribose sugar in its nucleotide

D. It is found as a double helix molecule

19. The minimum number of carbons in monosaccharide is

A. 4

B. 5

C. 3

D. 2

E. 1

20. In the formation of macromolecule what type of reaction would join two subunits together

A. Hydrophobic reaction

B. Hydrolysis reaction

C. Dehydration reaction

D. Denaturation reaction

21. Assuming that all of the below given compound had the same number of carbon atoms, which of the following has the most C-H bonds

A. Unsaturated fat

B. Poly saturated fat

C. Polysaccharides

D. Saturated fats

22. The different chemical and physical properties of amino acid depends on

A. Carboxyl group

B. Amino group

C. Side chain

D. Alpha Carbon

23. Aldose sugars and ketose sugars differ in

A. Position of carbonyl group

B. Number of carbonyl groups

C. Position of carboxyl group

D. Number of carboxyl groups

24. Cholesterol is a

A. Triglyceride

B. Phospholipid

C. Steroid

D. Proteins

E. All of the above

25. Which of the following isn't a disaccharide

A. Sucrose

B. Maltose

C. Lactose

D. Amylose

26. Which of the following is hydrophobic

A. Cellulose

B. Starch

C. Animal fats

D. Oils

E. C + D

27. Which the following is true about saturated fats?

A. It contains unsaturated fatty acid with double bond

B. It contains saturated fatty acid with no kinks

C. It is solid at room temperature

E. All of them are correct except A

28. Oils are liquid at room temperature because they

A. Are small molecules

B. Are nonpolar

C. Are hydrophobic

D. Contains unsaturated fatty acid

E. Contains saturated fatty acid

29. Which of the following is true :

A. Amylose is branched molecule

B. Amylopectin is unbranched molecule

C. Starch contains alpha glucose in its monomer

D. Human can digest starch

E. Both C and D are correct

30. Misfolded protein involved in :

A. Mad cow disease

B. Parkinson's disease

C. Cystic fibrosis

D. Alzheimer's

E. All of the above

31. which of the following found only in RNA :

A. Ribose sugar and adenine

B. Deoxyribose sugar and uracil

C. Ribose sugar and uracil

D. Ribose sugar and guanine

E. Any of the above

32. Large organic molecules are usually assembled by polymerization of few kinds of simple subunits.

Which of the following is exception to this statement ?

A. A steroid

B. Cellulose

C. DNA

D. An enzyme

E. A contractile protein

33. The bonding of two amino acid molecules to form larger molecule requires :

A. The release of water molecule

B. The release carbon dioxide molecule

C. The addition of nitrogen atom

D. The addition of water molecule

E. The release of nitrogen dioxide molecule

34. Which of the following is false about cellulose ?

A. It made of B-glucose

B. It is the main component of plant cell wall

C. Can form hydrogen bond with other parallel cellulose molecules

D. it cannot be digested by human enzymes

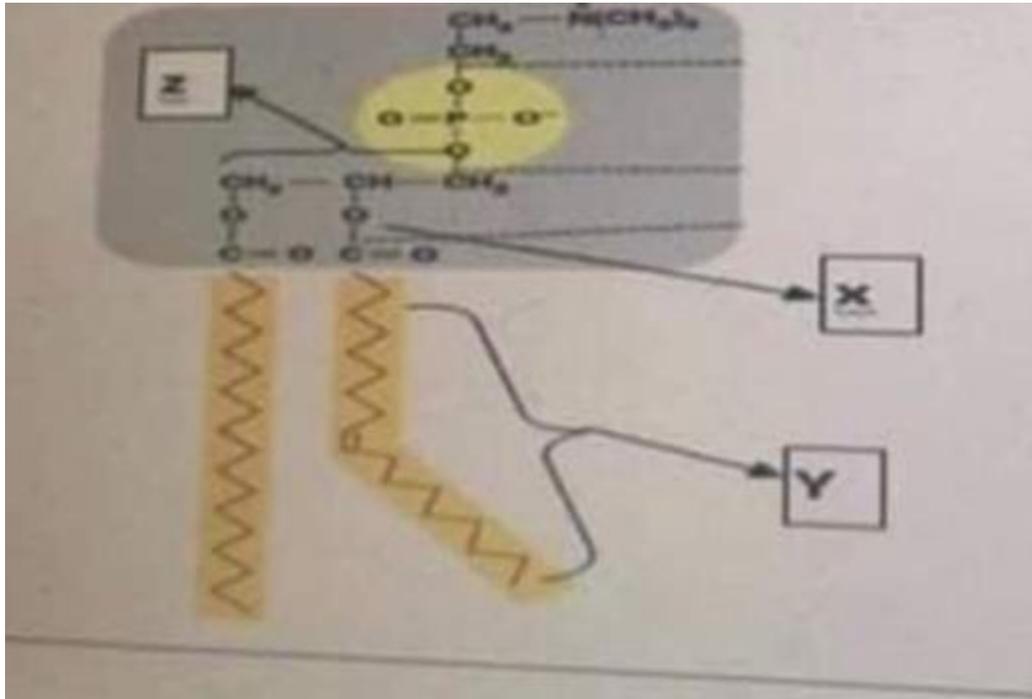
E. All of them are true

35. Which of the following not polymer

A. Steroid

- B. Starch
- C. Cellulose
- D. Chitin

36. The bond at (X) is described as \_\_\_\_\_ bond



- A. Glycosidic
- B. Ester
- C. Peptide
- D. Ionic

37. Which of the following nitrogenous bases is purine

- A. C and G
- B. A and G
- C. U and T

38. What type of macromolecule carries out catalysis in biological systems

- A. Protein called enzymes
- B. Carbs called starches
- C. Lipids called steroids

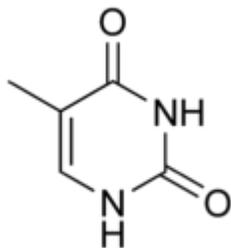
39. What are the most diverse macromolecule in the cell

- A. Lipid
- B. Mineral salts
- C. Proteins
- D. Carbs

40. In a sucrose molecule, the linkage between glucose and fructose is :

- A. 1-4 glycosidic
- B. 1-2 glycosidic
- C. 1-6 glycosidic
- D. Peptide
- E. Ester

41. The figure represents



- A. Purine
- B. Pyrimidine
- C. Sugar
- D. Fat

42. Molecule with which functional group may form polymers via dehydration reactions ?

- A. hydroxyl group
- B. carbonyl group
- C. Carboxyl group
- D. Either carbonyl or carboxyl group
- E. Either carboxyl or hydroxyl group

43. Which of these molecules is not formed by dehydration reaction ?

- A. Fatty acid
- B. Disaccharide
- C. DNA

D. Protein

E. Amylose

44. Which of these classes of biological molecule consist of both small molecules and macromolecules polymers ?

A. Lipids

B. Carbohydrates

C. Protein

D. Nucleic acid

E. Lipids, carbohydrates, protein and nucleic acid all consist of only macromolecular polymer

45. Which of the following is not a polymer ?

A. Glucose

B. Starch

C. Cellulose

D. Chitin

E. DNA

46. Which of the following is true about sickle cell anemia?

A. It is caused by point mutation that lead to substitution of one amino acid

B. It is involved abnormal alpha subunit

C. Hemoglobin molecules aggregate in a long fiber

D. Reduced capacity for oxygen transport

E. All of them are true except of (B)

47. Which of the following categories includes all other in the list?

A. Disaccharide

B. Polysaccharide

C. Starch

D. Carbohydrate

48. Which is the chemical reaction mechanism by which cell make polymer from monomers ?

A. Phosphodiester linkages

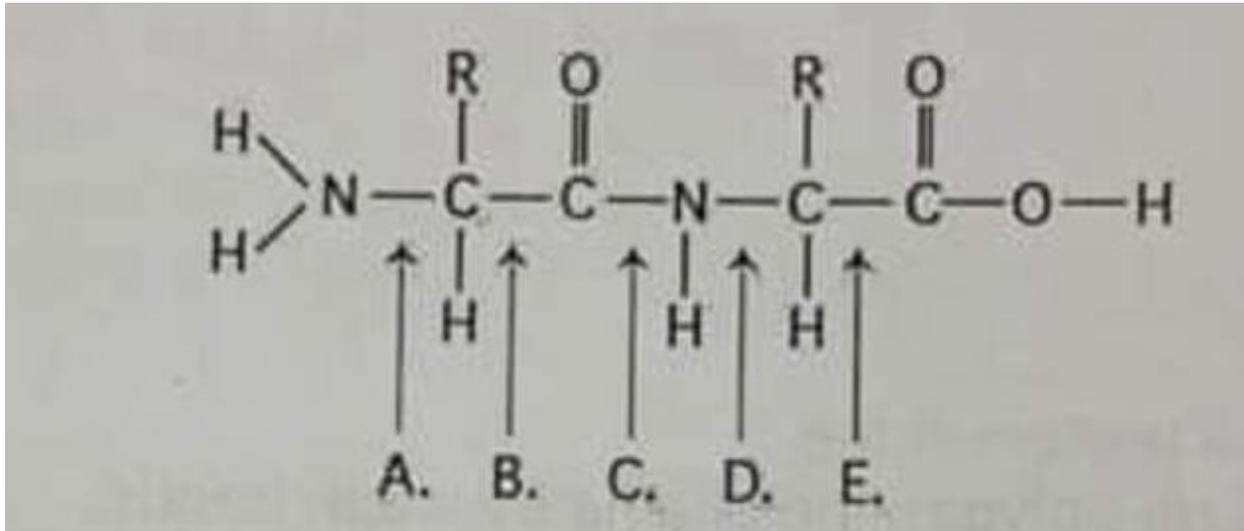
B. Hydrolysis

C. Dehydration reaction

D. Ionic bonding of monomers

E. The formation of disulfide bridges between monomers

49. According to the figure



A) Which bond is peptide bond?

A. A

B. B

C. C

D. D

E. E

B) Which bond is closest to the amino terminus of the molecule?

A. A

B. B

C. C

D. D

E. E

C) At which bond water needed to be added to achieve hydrolysis of the peptide

A. A

B. B

C. C

D. D

E. E

50. How many molecules of water are needed to completely hydrolyze a polymer that is 11 monomers long ?

A. 12

B. 11

C. 10

D. 9

E. 8

51. Which of the following is best summarizes the relationship between dehydration reaction and hydrolysis ?

A. Dehydration reaction assemble polymers, and hydrolysis reaction break down polymers

B. Dehydration reaction eliminate water from lipid membranes, and hydrolysis make lipid membranes water permeable

C. Dehydration reaction can occur only after hydrolysis

D. Hydrolysis creates monomers, and dehydration reaction break down polymers

E. Dehydration reaction ionize water molecules and add hydroxyl group to polymers; hydrolysis reaction release hydroxyl group from polymers

52. Lactose, a sugar in milk, is composed of one glucose molecule joined by a glycosidic linkage to one galactose molecule. How is lactose classified ?

A. As a pentose

B. As a hexose

C. as a monosaccharide

D. As a disaccharide

E. As a polysaccharide

53. Human sex hormone can be classified as

A. Protein

B. Lipid

C. Steroids

D. B+C

E. A+ B

54. The simplest amino acid is

A. Glycine

B. Serine

C. Valine

D. Lysine

55. Which of the following is true of both starch and cellulose ?

A. They are both polymers of glucose

B. They are cis-trans isomers of each other

C. They can both be digested by humans

D. They are both used for energy storage in plants

E. They are both structural components of the plant cell wall

56. Which of the following statements is true for the class of biological molecules known as lipids ?

A. They are insoluble in water

B. They are made from glycerol, fatty acid, phosphate

C. They contain less energy than proteins and carbohydrates

D. They are made by dehydration reaction

E. They contain nitrogen

57. When a protein loses its native shape it is called :

A. Denaturation

B. Renaturation

C. Destruction

D. Deformation

E. None of the above

58. Phospholipids contain :

A. Glycerol

B. 2 hydrocarbon tails

C. Phosphate group

D. Amino group

E. All of them except of (D)

59. There are 20 different amino acids, what makes one amino acid different from another

A. Different side chain (R group) attached to COOH group

B. Different side chain (R group) attached to amino groups

C. Different side chain (R group) attached to a carbon

D. Different asymmetric carbons

60. Upon chemical analysis, a particular polypeptide was found to contain 100 amino acids, how many peptide bonds are present in this protein

A. 100

B. 101

C. 99

D. 98

E. 97

61. If a DNA sample were composed of 10% thymine, what would be the percentage of guanine

A. 10

B. 20

C. 40

D. 80

62. which of the following polymers contain nitrogen ?

A. Starch

B. Glycogen

C. Cellulose

D. Chitin

E. Amylopectin

63. a molecule with the chemical formula  $C_6H_{12}O_6$  is probably a:

A. Carbohydrate

B. Lipid

C. Monosaccharide

D. Carbohydrate and lipid only

E. Carbohydrate and monosaccharide only

64. The molecular formula for glucose is  $C_6H_{12}O_6$ . What would be the molecular formula for a polymer made by linking 10 glucose by dehydration reaction (CHO)

A.  $(60\ 120\ 60)$

B.  $(6\ 12\ 6)$

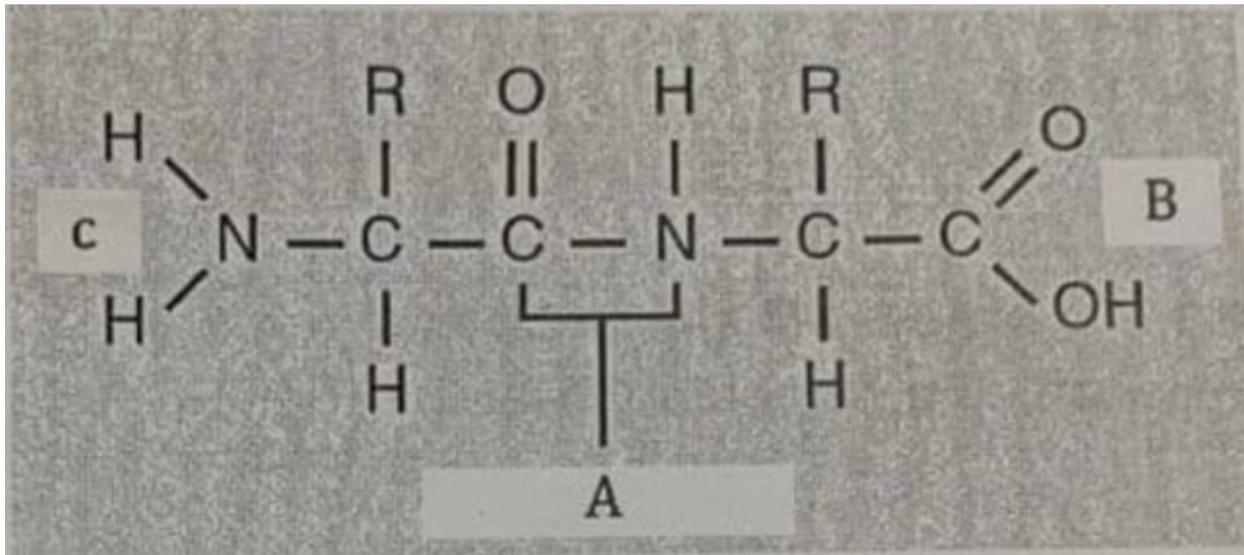
C.  $(60\ 102\ 51)$

D.  $(60\ 100\ 50)$

رضب صيغة الغلوكوز ب

بن ١٠ بعدها بنطرح ٩ جزيئات ماء

65.

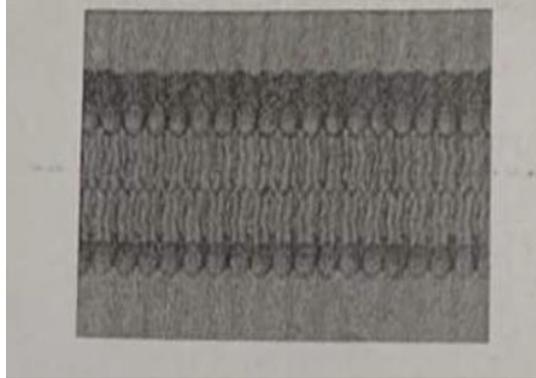


A: A represent ——— bond

B: B represent ———

C: C represent ———

66. The figure shows

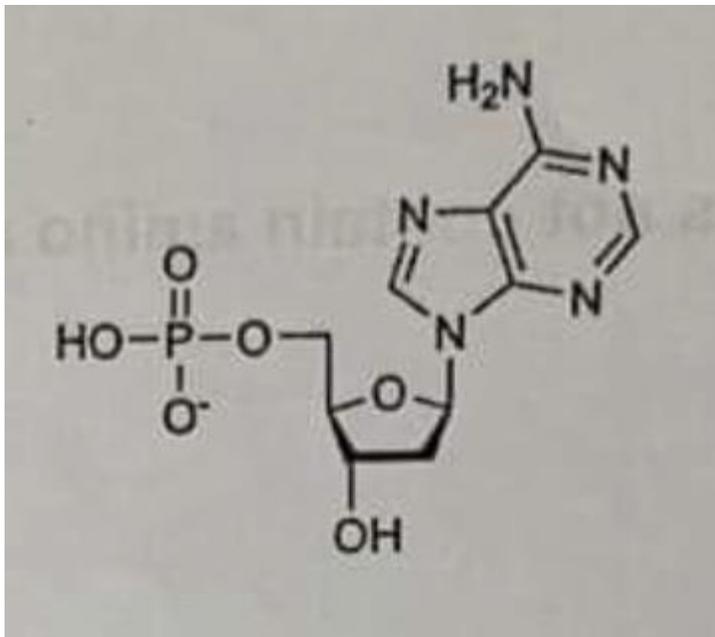


- A. Phospholipid bilayer
- B. The structure of cell membrane
- C. Unsaturated fats
- D. Cholesterols
- E. A+B

67. The figure shows



- A. RNA 3d shape
- B. Collagen
- C. Cellulose
- D. DNA



68. The figure represents

- A. Nucleotide
- B. Nucleoside mono phosphate
- C. Nucleoside diphosphate
- D. A+ B

69. Which of the following pairs of base form normal double helix of DNA

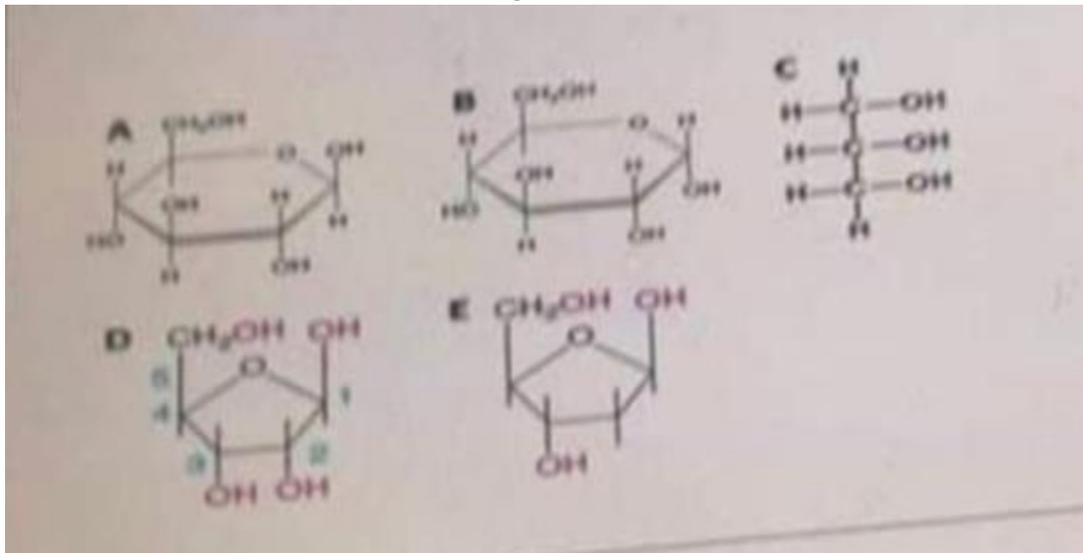
- A. 5'-AGCT-3' with 5'-TCGA-3'
- B. 5'-GCGC-3' with 5'-TATA-3'
- C. 5'-ATGC-3' with 5'-GCAT-3'
- D. All of the above are correct

70. The molecular formula for a polymer of 10 ribose molecules

(C H O)

- A. 6 12. 6
- B. 5. . 10. . 5
- C. 60. 120. 60
- D. 60. 102. 51
- E. 50 82. 41

71. Which of the molecules shown in the figure is the monomer of cellulose



- A. A
- B. B
- C. C
- D. D
- E. E

72. The tertiary structure of protein is the

Unique 3d shape of the fully folded polypeptide

73. RNA molecules can find as a 3D shape due to :

A. Hydrogen bonds between complementary base pairing

"All lives end. All hearts are broken. Caring is not an advantage." -"

Answers

- 1. B
- 2. A
- 3. E
- 4. D
- 5. B
- 6. C
- 7. D

8. C

9. B

10. B

11. A

12. A

13. A

14. E

15. B

16. E

17. D

18. D

19. C

20. C

21. D

22. C

23. A

24. C

25. D

26. E

27. E

28. D

29. E

30. E

31. C

32. A

33. A

34. E

35. A

36. B

37. B

38. A

39. C

40. B

41. B

42. E

43. A

44. B

45. A

46. E

47. D

48. C

49. A) C B) A C) C

50. C

51. A

52. D

53. D

54. A

55. A

56. A

57. A

58. E

59. C

60. C

61. C

62. D

63. E

64. C

65. A: Peptide bond

B: C terminus

C: N terminus

66. E

67. B

68. D

69. C

70. E

71. A

Chapter 7

A) Which of the following pairs would be separated by different configurations?

A) Ribosomes , Mitochondria

B)  $\text{Na}^+$  ,  $\text{K}^+$

C)  $\text{Cl}^-$  ,  $\text{H}_2\text{PO}_4^-$

D) Amino Acids , glucose

E) None of the above

B) Viruses can be seen by

A) Compound microscope

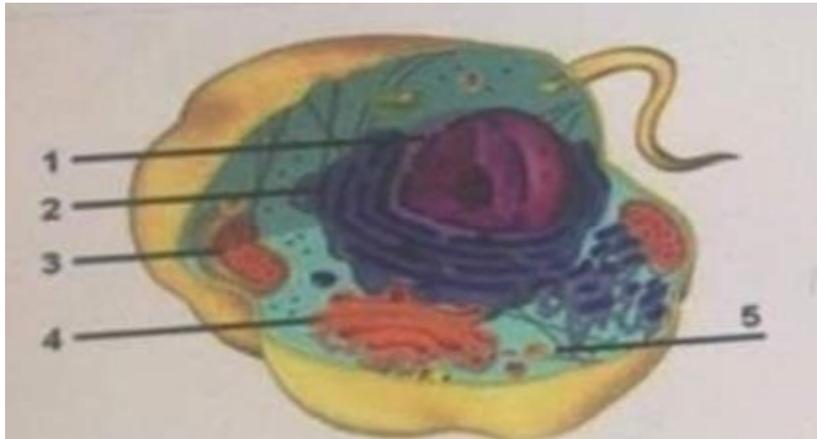
B) Dissecting microscope

C) Electron microscope

D) Unaided eye

E) A,B and C

C) Which organelle is responsible for the production of membrane proteins?



A) 1

B) 2

C) 3

D) 4

E) 5

D) Structure A in the picture functions in all of the following except



A Carbohydrate metabolism

B Steroids synthesis

C Calcium storage

D Drugs detoxification

E Proteins sorting and packaging

E) The middle lamella that joins plant cells together is

A) produced by the endoplasmic reticulum

B) produced by the Golgi apparatus

C) rich in sticky polysaccharides called pectins

D) made of cellulose

E) B&C are correct

F) Which of the following organelles are interconnected and made of membranous sacs called cisternae?

A) Golgi apparatus

B) Smooth endoplasmic reticulum

C) Rough endoplasmic reticulum

D) B&C

E) All of the above

G) Large organisms do not generally have larger cells than small organisms, but simply have more cells, because

A) Smaller cells have greater surface area to volume ratio

B) Smaller cells have smaller surface area to volume ratio

C) Diffusion cannot occur in large cells

D) Large cells have fewer metabolic reactions

E) Small cells move faster than large cells

1) Which of the following contain the 9 + 2 arrangement of microtubules?

A) Cilia

B) Centrioles

C) Flagella

D) A and C only

E) A, B, and C

2) Which of the following possesses a micro tubular structure similar to a basal body?

A) Centrioles

B) Lysosome

- C) Nucleolus
- D) Peroxisomes
- E) Ribosome

3) Which statement correctly characterises bound ribosomes?

- A) Bound ribosomes are enclosed in their own membrane.
- B) Bound and free ribosomes are structurally different
- C) Bound ribosomes generally synthesise membrane proteins and secretory proteins.
- D) The most common location for bound ribosomes is the cytoplasmic surface of the plasma membrane.
- E) All of the above.

4) Tay-Sachs disease is a human genetic abnormality that results in cells accumulating and becoming clogged with very large and complex lipids.

Which cellular organelle must be involved in this condition

- A) The endoplasmic reticulum
- B) The Golgi apparatus
- C) Lysosomes
- D) Mitochondria
- E) membrane-bound ribosomes

5) Which is one of the main energy transformers of cells?

- A) Lysosome
- B) Vacuole
- C) Mitochondrion
- D) Golgi apparatus
- E) Peroxisomes

6) Which of the following contains its own DNA and ribosomes?

- A) Lysosome
- B) Vacuole
- C) Mitochondrion

D) Golgi apparatus

E) Peroxisomes

7) A cell has the following molecules and structures: enzymes, DNA, ribosomes, plasma membrane, and mitochondrion, it could be a cell from

A) A bacterium.

B) An animal, but not a plant.

C) A plant, but not an animal.

D) A plant or an animal.

E) any kind of organism.

8) Cyanide binds with at least one molecule involved in producing ATP. If a cell is exposed to cyanide, most of the cyanide would be found within the

A) mitochondria.

B) Ribosomes.

C) Peroxisomes.

D) Lysosomes.

E) Endoplasmic reticulum.

9) The liver is involved detoxification of many poisons and drugs. Which of the following structures is primarily involved in this process and therefore abundant in liver cells?

A) Rough ER

B) Smooth ER

C) Golgi apparatus

D) Nuclear envelope

E) Transport vesicles

10) 49) Which of the following produces and modifies polysaccharides that will be secreted?

A) Lysosome

B) Vacuole

C) Mitochondrion

D) Golgi apparatus

E) Peroxisomes

11) Which type of organelle is primarily involved in the synthesis of oils, phospholipids, and steroids?

- A) Ribosome
- B) Lysosome
- C) Smooth endoplasmic reticulum
- D) Mitochondrion
- E) Contractile vacuole

12) Which of the following contains hydrolytic enzymes?

- A) Lysosomes
- B) Vacuole
- C) Mitochondrion
- D) Golgi apparatus
- E) Peroxisomes

13) Which of the following are capable of converting light energy to chemical energy?

- A) Chloroplasts
- 8) Mitochondria
- C) Leucoplasts
- D) Peroxisomes
- E) Golgi bodies

14) Which of the following is a function of cell wall?

- A) Prevent excessive uptake of the water
- B) Protection
- C) Maintain the cell shape
- D) Holding plant against gravity
- E) All of the above

15) Which of the following is true about free ribosomes?

- A) It is attached to the nuclear envelope
- B) It is attached to the ER
- C) They produce the proteins that must be secreted out the cell

D) Producing cytoplasmic proteins

E) None of the above

16) ----- is a framework of protein fibres extending throughout the nuclear interior

A) Nuclear lamina

B) Nuclear matrix

C) Middle lamella

D) Pore complex

E) None of the above

17) For studying Phagocytosis (Lysosome function) , the best cells used to study it:

A) Liver cells

B) Red blood cells

C) Macrophages

D) Skin cell

E) None of the above

18) The main function of cell fractionation?

- Separation of major organelles and sub-cellular components

19) Which of the following is not a function of cytoskeleton?

A) Transporting of molecules into the cell

B) Transporting of molecules within the cell

C) Providing structure and shape

D) Anchoring the cell

E) Cell movement

20) Which of the following organelles is absent in plant cells?

A) Plasma membrane

B) Cell wall

C) Chloroplast

D) Central vacuole

E) Centrosome

21) Grana and thylakoid can be found in:

A) Mitochondria

B) Chloroplasts

C) Golgi

D) Rough ER

E) Peroxisomes

22) All of the following is found in prokaryotic cells except

A) DNA

B) Chromosomes

C) Ribosomes

D) Cytosol

E) Nuclear envelope

23) Which of the following organelles responsible of proteins synthesis

A) Ribosomes

B) Lysosomes

C) Mitochondria

D) Microtubule

E) Nucleus

24) Large number of ribosomes can be found in cells that produce:

A) Proteins

B) Carbohydrate

C) Lipids

D) DNA

E) RNA

25) Which type of junctions establishes a barrier that prevents leakage of extracellular fluid across a layer of epithelial cells?

A) Tight Junction

B) Gap junction

C) Desmosomes

D) Plasmodesmata

E) None of the above

26) Ribosomes can be seen by:

A) Light microscope

B) Electron microscope

C) Unaided eye

D) None of the above

E) All of the above

27) Under which of the following conditions would you expect to find a cell with a predominance of free ribosomal?

A) A cell that is secreting proteins

B) A cell that is producing cytoplasmic enzymes

C) A cell that is constructing its cell wall or extracellular matrix

D) A cell that is digesting food particles

E) A cell that is enlarging its vacuole

28) Materials from one animal cell can enter adjacent cell by :

A) Tight Junction

B) Gap Junction

C) Desmosome

D) Microfilament

E) Intermediate filament

29) Microtubules are not involved in?

A) Cilia

B) Flagella

C) Movement of organelles

D) Cell division

E) Amoeboid movement

30) The plant cell's central vacuole :

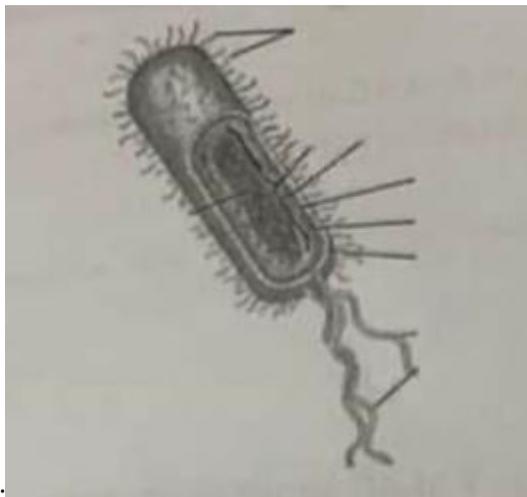
- A) Play a major role in growth
- B) Store nutrient
- C) Reservoir of Inorganic ions
- D) Occupied large space of the cell
- E) All of the above

31) The nuclear envelope is directly connect to:

- A) Endoplasmic reticulum
- B) Golgi apparatus
- C) Lysosomes
- D) Peroxisomes
- E) Food vacuole

32) Which of the following found in both bacteria and plant cells:

- A) Chloroplasts
- B) Cell wall
- C) Nucleus
- D) Mitochondria
- E) None of the above



33) The figure represents :

- A) Prokaryote
- B) Eukaryote
- C) Animal cell

D) Plant cell

E) Protists

34) Which of the following is a function of the smooth ER?

A) Detoxification of drugs

B) Storage of calcium ions

C) Synthesis of lipids

D) Synthesis of glycoproteins and secretory proteins

E) All of them except (D)

35) The organelle that can carry out (Autophagy process) is:

A) Golgi

B) ER

C) Nucleus

D) Mitochondria

E) Lysosomes

36) The correct pathway of secretory proteins:

A) Rough ER - Lysosome - Golgi - Plasma membrane

B) Smooth ER - Golgi - Transport vesicles - Plasma membrane

C) Rough ER - Golgi - Transport vesicle - Plasma membrane

D) Golgi - Lysosome - Plasma membrane

E) None of the above

37) The type of junction that can be seen between heart (Cardiac muscles) is

A) Tight junction

B) Gap junction

C) Desmosomes

D) Plasmodesmata

E) None of the above

38) Which of the following IS FALSE about lysosomes:

A) Can digest food and damage organelles

B) They are membranous

C) Contain hydrolytic enzymes

D) Has basic environment

E) All of the above is true

39) Cell wall can be found :

A) Plant cells only

B) Animal cells only

C) In both animal and plant cells

D) In plant cells and some prokaryote

E) Any of the above

40) Which of the following is correct?

A) Larger organisms have larger cells

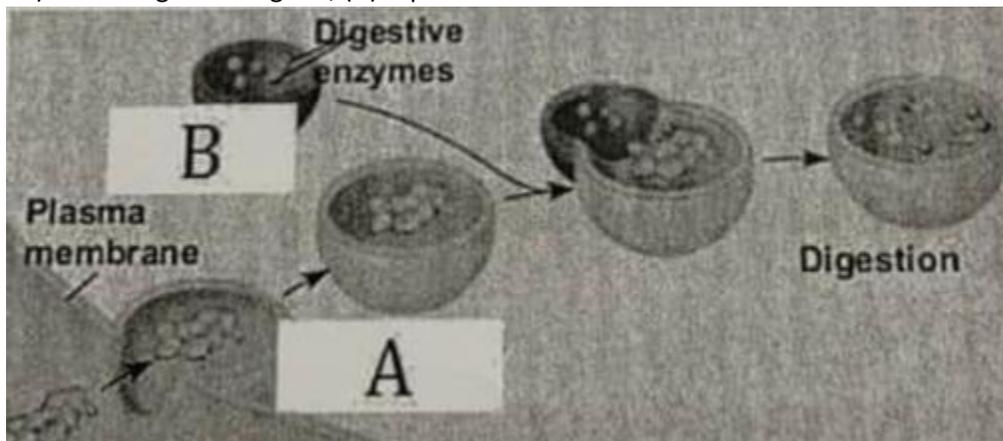
B) Larger organisms have more cells

C) Surface area to volume ratio is large in smaller cells

D) Surface area to volume ratio is small in smaller cells

E) Both B and C are correct

41) According to the figure , (A) represent:



A) Lysosome

B) Food vacuole

C) Contractile vacuole

D) Peroxisomes

42) Chloroplasts and mitochondria have in common a :

- A) Both of them bounded by double membrane
- B) Both of them contain DNA
- C) Both of them involved in energy conversion
- D) Both of them involved in digestion of food
- E) All of them true except of (D)

43) Which of the following is a compartment that often takes up much of the volume of a plant cell

- A) Lysosome
- B) Vacuole
- C) Mitochondrion
- D) Golgi apparatus
- E) Peroxisomes

ANSWERS

- A. A
- B. C
- C. B
- D. E
- E. E
- F. D
- G. A
- 1) D
- 2) A
- 3) C
- 4) C
- 5) C
- 6) C
- 7) D
- 8) A

9) B

10) D

11) C

12) A

13) A

14) E

15) D

16) B

17) C

18) ...

19) A

20) E

21) B

22) E

23) A

24) A

25) A

26) B

27) B

28) B

29) E

30) E

31) A

32) B

33) A

34) E

35) E

36) C

37) B

38) D

39) D

40) E

41) B

42) E

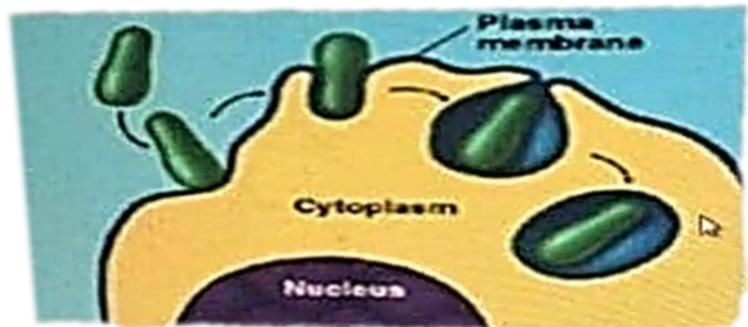
43) B

;

## Chapter 8

1) the process shown in the figure demonstrates

- a) Pinocytosis
- b) Phagocytosis
- c) Receptor-mediated endocytosis
- d) Photosynthesis
- e) contractile vacuole active transport



2. What are the membrane structures that function in active transport?

- a) Peripheral proteins
- b) Carbohydrates
- c) Receptor proteins
- d) Carrier proteins
- e) All of the above

3. Facilitated diffusion:

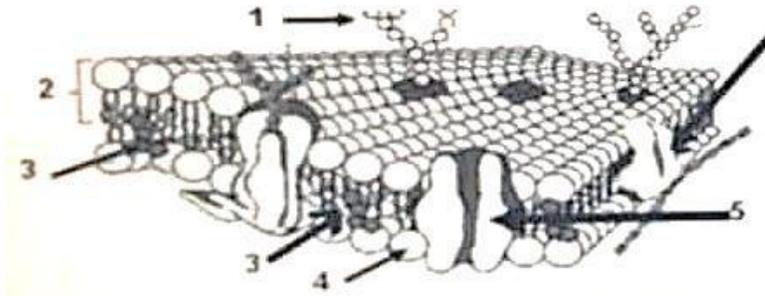
- a) Requires either channel or carrier proteins
- b) Occur down a concentration gradient
- c) Require the hydrolysis of ATP
- d) Occur in all cells
- e) All of the above are correct except C

4. Which of the following is an electrogenic pump?

- a)  $\text{Na}^+\text{-K}^+$  pump
- b) Glucose carrier

- c) H<sup>+</sup> pump
- d) All of the above
- e) Only A and C

5. Which structure can function as aquaporin?



- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

6. In order for a protein to be an integral membrane protein it would have to be:

- a) Hydrophilic
- b) Hydrophobic
- c) Amphipathic, with at least one hydrophobic region
- d) Completely covered with phospholipids
- e) Exposed on only one surface of the membrane

7. Which of the following types of molecules are the major structural components of the cell membrane?

- a) Phospholipids and cellulose
- b) Nucleic acids and proteins
- c) Phospholipids and proteins
- d) Proteins and cellulose
- e) Glycoproteins and cholesterol

8. Which of the following is true of integral membrane proteins?

- a) They lack tertiary structure
- b) They are loosely bound to the surface of the bilayer

- c) They are usually transmembrane proteins
- d) They are not mobile within the bilayer
- e) They serve only a structural role in membranes

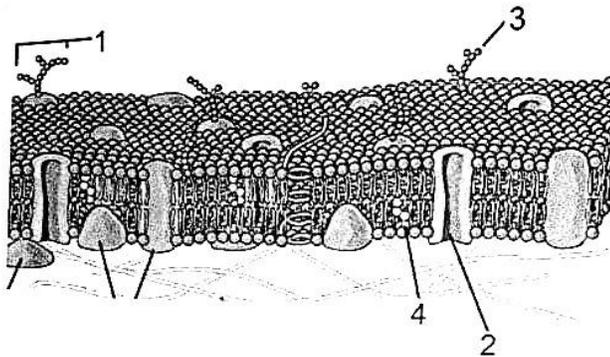
9. The primary function of polysaccharides attached to the glycoproteins and glycolipids of animal cell membranes is

- a) To facilitate diffusion of molecules down their concentration gradients
- b) To actively transport molecules against their concentration gradients
- c) To maintain the integrity of a fluid mosaic membrane
- d) To maintain membrane fluidity at low temperatures
- e) To mediate cell-to-cell recognition

10. Water passes quickly through cell membrane because:

- a) It is small polar molecule
- b) Its movement is driven by ATP hydrolysis
- c) It moves through aquaporins
- d) The membrane bilayer is hydrophilic
- e) The membrane interior is hydrophobic

11. Which structure can function as aquaporin?



- a) 1
- b) 2
- c) 3
- d) 4
- e) None of the above

12. Which of the following statements correctly describes the normal tonicity conditions for typical plant and animal cells?

- a) The animal cell is in a hypotonic solution, and the plant cell is in an isotonic solution.
- b) The animal cell is in an isotonic solution, and the plant cell is in a hypertonic solution.
- c) The animal cell is in a hypertonic solution, and the plant cell is in an isotonic solution.
- d) The animal cell is in an isotonic solution, and the plant cell is in a hypotonic solution.
- e) The animal cell is in a hypertonic solution, and the plant cell is in a hypotonic solution.

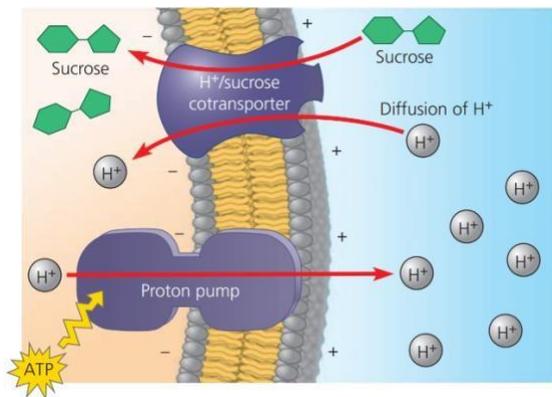
13. Which of the following functions of membrane proteins involves surface carbohydrate? a) Cell-cell recognition

- b) Enzymatic activity
- c) Transport
- d) Tight junctions
- e) None of the above

14. What kinds of molecules pass through a cell membrane most easily?

- a) Large and hydrophobic
- b) Small and hydrophobic
- c) Large polar
- d) Ionic
- e) Monosaccharides such as glucose

15. In the figure shown, a proton passes to the cytosol:

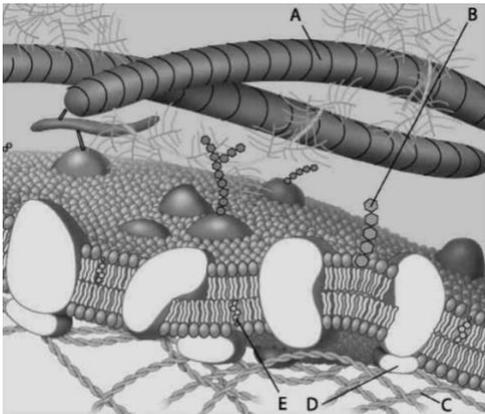


- a) Down its concentration gradient
- b) By simple diffusion
- c) Against its concentration gradient
- d) Down its electrochemical gradient
- e) None of the above

16. What is the voltage across a membrane called?

- a) Water potential
- b) Chemical gradient
- c) Membrane potential
- d) Osmotic potential
- e) Electrochemical gradient

According to the figure below, answer questions 17, 18 and 19:



17. Which component is the peripheral protein?

- a) A
- b) B
- c) C
- d) D
- e) E

18. Which component is cholesterol?

- a) A
- b) B
- c) C
- d) D
- e) E

19. Which component is a glycolipid?

- a) A
- b) B

- c) C
- d) D
- e) E

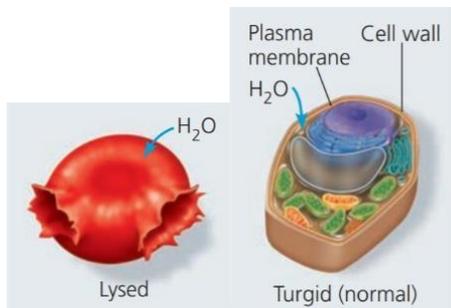
20. Fluid mosaic model of the membrane proposed that

- a) Membranes are a phospholipid bilayer
- b) Membranes are a phospholipid bilayer between two layers of hydrophilic proteins
- c) Membranes are a single layer of phospholipids and proteins
- d) Membranes consist of protein molecules embedded in a fluid bilayer of phospholipids
- e) Membranes consist of a mosaic of polysaccharides and proteins

21. Which of the following is involved in engulfing of droplets contains dissolved materials? a) Phagocytosis

- b) Pinocytosis
- c) Receptor mediated endocytosis
- d) Exocytosis
- e) Facilitated diffusion

22. These cells can be found in:



- a) Hypertonic solution
- b) Hypotonic solution
- c) Isotonic solution
- d) None of the above
- e) All of the above

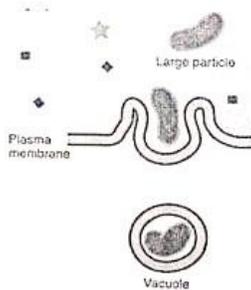
23. Which of the following is true about sodium potassium pump?

- a) It can pump 3 sodium ions out of the cell
- b) It can pump 2 potassium ions into the cell
- c) The pump powered by ATP
- d) The process is an active transport
- e) All of the above are true

24. "Co-transport" is:

- a) Coupling of uphill to a downhill one
- b) Using of ATP to transport materials against their concentration
- c) Using of ATP to transport materials down their concentration
- d) "Proton-sucrose" co-transporter is an example for this process
- e) Both A and D are correct

25. The figure shows:



- a) Phagocytosis
- b) Pinocytosis
- c) Receptor mediated endocytosis
- d) Exocytosis
- e) Facilitated diffusion

26. Ions diffuse across membranes through specific ion channels

- a) Down their chemical gradients
- b) Down their concentration gradients
- c) Down the electrical gradients
- d) Down their electrochemical gradients
- e) Down the osmotic potential gradients

27. Water enters and leaves plant and animal cells by:

- a) Pinocytosis
- b) Simple diffusion
- c) Osmosis
- d) Co-transport
- e) Bulk transport

28. Low density lipoproteins (LDL) enter cells by:

- a) Pinocytosis
- b) Phagocytosis
- c) Active transport
- d) Receptor mediated endocytosis
- e) Passive transport

29. Nonpolar small hydrocarbons,  $\text{CO}_2$ , and  $\text{O}_2$  cross the membrane by:

- a) Simple diffusion
- b) Active transport
- c) Facilitated diffusion
- d) Bulk transport
- e) Co-transport

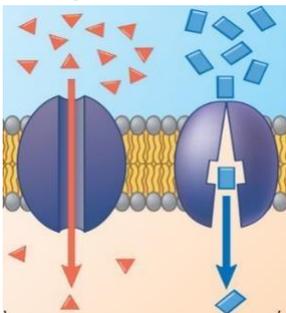
30. When plant cells are placed in hypertonic solution, they will

- a) Lyse
- b) Be turgid
- c) Plasmolyze
- d) Shrink
- e) Be flaccid

31. The secretion of substances out of the cell through small vesicles is an example of:

- a) Exocytosis
- b) Pinocytosis
- c) Endocytosis
- d) Osmoregulation
- e) Phagocytosis

32. The figure shows:



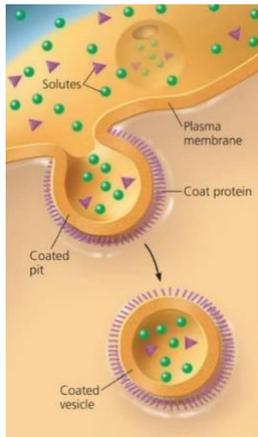
- a) Co-transport

- b) Osmosis
- c) Ion pump
- d) Facilitated diffusion
- e) Phagocytosis

33. Channel proteins are required for:

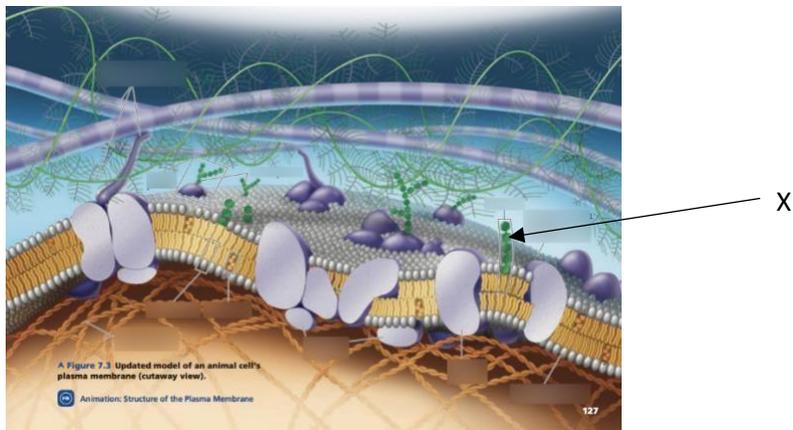
- a) Osmosis
- b) Facilitated diffusion
- c) Active transport
- d) Phagocytosis
- e) A and B are correct

34. This figure shows the processes of:



- a) Exocytosis
- b) Phagocytosis
- c) Pinocytosis
- d) Receptor mediated endocytosis
- e) Osmosis

35. The part pointed at (X) in the figure represents



- a) Carbohydrate
  - b) Cholesterol
  - c) Phospholipid
  - d) Collagen fiber
  - e) Fatty acid
36. Which of the following is involved in the  $\text{Na}^+$  passive transport across plasma membrane? a) ATP
- b) Electrical membrane potential (electrical force)
  - c) Gated channel proteins
  - d)  $\text{Na}^+$  concentration gradient (chemical force)
  - e) B and D are correct
37. One of the functions of cholesterol in animal cell membrane is to:
- a) Store energy
  - b) Maintain membrane fluidity
  - c) Speed diffusion
  - d) Phosphorylate ADP
  - e) None of the above

# Answers

<b>1</b>	b	<b>14</b>	b	<b>27</b>	c
<b>2</b>	d	<b>15</b>	a	<b>28</b>	d
<b>3</b>	e	<b>16</b>	c	<b>29</b>	a
<b>4</b>	e	<b>17</b>	d	<b>30</b>	c
<b>5</b>	e	<b>18</b>	e	<b>31</b>	a
<b>6</b>	c	<b>19</b>	b	<b>32</b>	d
<b>7</b>	c	<b>20</b>	d	<b>33</b>	e
<b>8</b>	c	<b>21</b>	b	<b>34</b>	c
<b>9</b>	e	<b>22</b>	b	<b>35</b>	a
<b>10</b>	c	<b>23</b>	e	<b>36</b>	e
<b>11</b>	b	<b>24</b>	e	<b>37</b>	b
<b>12</b>	d	<b>25</b>	a		
<b>13</b>	a	<b>26</b>	d		