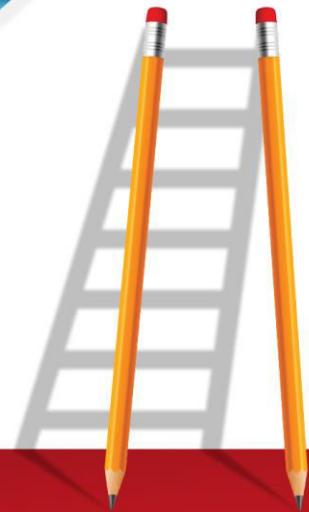


BIOLOGY



Worksheet-11



STP

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Worksheet-11
(Enzyme)

Q.1 It forms a fluid cushion around organs that helps to protect them from trauma:

- A) Protein C) Vitamin
B) Lipid D) Water

Q.2 Biological importance of water is/are:

- A) Polarity
B) Universal solvent
C) High specific heat and high heat of vaporization
D) Polarity, Universal solvent and high specific heat and High heat of vaporization

Q.3 The heat required to convert one gram of liquid water into vapors at its boiling point is called:

- A) Heat of condensation
B) Heat of neutralization
C) Specific heat
D) Heat of vaporization

Q.4 Protoplasm of living cell can survive, if its water contents upto:

- A) 20% C) 70%
B) 10% D) 50%

Q.5 All are biological importance of water, EXCEPT:

- A) Polar molecule
B) Universal solvent
C) High specific heat and high heat of vaporization
D) Water expands at high temperature

Q.6 The amount of heat energy required to raise the temperature of one gram of water by one-degree celsius:

- A) Heat of neutralization of water
B) Heat of condensation of water
C) Heat of vaporization of water
D) Specific heat of water

Q.7 It is a process in which large organic molecules are synthesized and water molecule is removed:

- A) Hydrolysis C) Hydrogenation
B) Condensation D) Decarboxylation

Q.8 Which one of the following is not correct about water?

- A) Water has high specific heat
B) Water has high heat of vaporization
C) Water is not universal solvent
D) Water exhibits strong cohesion tension

Q.9 Ice floats because:

- A) It is less dense than water
B) It is more dense than water
C) It occupies less space than water
D) It occupies more space than water

Q.10 Which one of the following is not a property of water?

- A) Hydrophobic properties
B) Hydrophilic properties
C) Very good solvent
D) Strong surface tension

Q.11 After taking a shower, you notice that some water droplets are clinging to the shower curtain. This is an example of:

- A) Adhesion C) Ionic bonding
B) Cohesion D) Surface tension

Q.12 The formation of a large molecule from two small molecules with the removal of water is called:

- A) Condensation
- B) Hydrolysis
- C) Dehydration synthesis
- D) Sublimation

Q.13 Water:

- A) Is a good solute
- B) Serves as enzyme
- C) Is a universal solvent
- D) Serve as energy currency

Q.14 Which one of the following is called biological catalysts?

- A) Clotting factor C) Enzyme
- B) Osmotic protein D) Vitamin

Q.15 The active site of enzymes consists of:

- A) Only few amino acids
- B) Only a few amino acids
- C) Bulk of amino acids
- D) One or two amino acids

Q.16 _____ maintains the globular structure of the enzyme.

- A) Few amino acids
- B) A few amino acids
- C) Many amino acids
- D) Bulk of the amino acids

Q.17 Often it contributes directly to the chemical reactions which bring about catalysis:

- A) Prosthetic group C) Co-enzymes
- B) Co-factor D) Activator

Q.18 If non-protein part of enzyme is covalently bonded to the protein part, it is called:

- A) Holoenzyme C) Prosthetic group
- B) Co-enzyme D) Apo-enzyme

Q.19 An activated enzyme consisting of polypeptide chain and a cofactor is known as:

- A) Apoenzyme C) Co-enzyme
- B) Holoenzyme D) Pseudo enzyme

Q.20 Enzymes are sensitive to even a minor change in:

- A) pH
- B) Temperature
- C) Substrate conc.
- D) pH, temperature and substrate conc.

Q.21 _____ is a powerful protein digesting enzyme and is capable of destroying cell's internal structure and thus produced in inactive _____ form by the cell.

- A) Pepsin, Pepsinogen
- B) Pepsinogen, Pepsin
- C) Pepsin, Trypsin
- D) Trypsin, Pepsin

Q.22 After the formation of products, it is released unaltered and thus can be used again:

- A) Substrate C) Inhibitor
- B) Enzyme D) Hormone

Q.23 $E + S \rightleftharpoons$ _____:

- A) $E + P$ C) $E + S$
- B) ES D) EI

- Q.24** Enzymes involved in some metabolic pathways are normally present together:
- A) Randomly
 - B) In descending order
 - C) In reverse order
 - D) In precise order
- Q.25** The charge and shape of the active site of the enzyme is formed by _____ in the polypeptide chain of the active site of the enzyme.
- A) Some amino acids
 - B) Many amino acids
 - C) Bulk of amino acids
 - D) One amino acids
- Q.26** The reaction between _____ activates the catalytic site of enzyme.
- A) Enzyme and substrate
 - B) Active site of enzyme and substrate
 - C) Substrate and binding site of enzyme
 - D) Enzyme and binding site of enzyme
- Q.27** According to this model enzyme is a rigid structure:
- A) Lock and key model
 - B) Induced fit model
 - C) Allosteric model
 - D) Isoenzyme model
- Q.28** According to _____ the active site of enzyme is not a rigid structure.
- A) Lock and key model
 - B) Emil Fischer's model
 - C) Induced fit model
 - D) Allosteric model
- Q.29** The functional specificity of every enzyme is the consequence of its:
- A) Specific chemistry
 - B) Specific configuration
 - C) Variable chemistry and configuration
 - D) Specific chemistry and configuration
- Q.30** The rate of reaction depends directly on the amount of enzyme provided the substrate concentration is:
- A) Unlimited
 - B) Low
 - C) Limited
 - D) Fixed
- Q.31** By increasing the enzyme molecules _____ will convert the substrate molecules into products, in the given period of time.
- A) Less active sites
 - B) More active sites
 - C) The same number of active site
 - D) No active site
- Q.32** If the enzyme conc. is kept constant, by increasing the substrate concentration the rate of enzyme action is:
- A) Never increased
 - B) Decreased
 - C) Increased forever
 - D) Increased for specific time
- Q.33** The rate of enzyme-controlled reactions may increase with increase in:
- A) Temperature upto minimum level
 - B) Temperature upto maximum level
 - C) Temperature upto optimum level
 - D) Temperature upto infinite level

Q.34 Chemical reactions are accelerated at high temperature because:

- A) Heat provides activation energy
- B) Heat lowers the activation energy
- C) Heat lowers the kinetic energy
- D) Heat makes the reactants remain static

Q.35 When reactants move more quickly and chances of their collision with each other are increased as a result the rate of enzyme-controlled reactions will?

- A) Decrease initially C) Increase for ever
- B) Increase initially D) Decrease for ever

Q.36 Inhibitors can be divided into:

- A) Two basic types C) Four basic types
- B) Three basic types D) Five basic types

Q.37 They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place temporarily:

- A) Irreversible inhibitors
- B) Reversible inhibitors
- C) Competitive inhibitors
- D) Non-competitive inhibitors

Q.38 Pick up the product:

- A) Succinic acid C) Fumaric acid
- B) Malonic acid D) Dehydrogenase

Q.39 Succinic acid dehydrogenase + malonic acid $\longrightarrow$?

- A) No reaction possible
- B) Fumaric acid
- C) Enzyme is blocked
- D) No reaction possible, Enzyme is blocked

Q.40 Which one of the following is reused?

- A) Substrate
- B) Enzyme
- C) Coenzyme
- D) Enzyme and Co-enzyme

Q.41 Some enzymes are potentially damaging if they are manufactured in their active form e.g.:

- A) Amylose C) Pepsinogen
- B) Pepsin D) Lipase

Q.42 Which one of the following products will control this pathway through feedback activation?



- A) B C) D
- B) C D) E

Q.43 $A \longrightarrow B \longrightarrow C \longrightarrow D \longrightarrow E$

Accumulation of "E" will control the above pathway through:

- A) Feedback mechanism
- B) Feedback activation
- C) Positive feedback
- D) Feedback inhibition

Q.44 $A \longrightarrow B \longrightarrow C \longrightarrow D \longrightarrow E$

Deficiency of "E" will control the above pathway through:

- A) Feedback mechanism
- B) Feedback activation
- C) Negative feedback
- D) Feedback inhibition

Q.45 Induce fit model was proposed by:

- A) Watson C) Emil Fischer
- B) Koshland D) F. Miescher

Q.46 Salivary amylase works best at pH:

- A) 2.00 C) 6.80
- B) 7.20 D) 8.50

Q.47 Optimum pH for the action of pancreatic lipase is:

- A) 2.00 C) 5.00
- B) 7.00 D) 9.00

Q.48 Malonic acid is competitive inhibitor of:

- A) Succinic acid
- B) Fumaric acid
- C) Succinic dehydrogenase
- D) Citric acid

Q.49 It causes denaturation of globular structure of enzyme:

- A) Slight change in pH
- B) Extreme pH change
- C) Competitive inhibitor
- D) Slight pH change

Q.50 Any molecule that increases the rate of a chemical reaction without being used up during that reaction is called:

- A) Coenzyme C) Apoenzyme
- B) Activator D) Catalyst

ANSWER KEY (Worksheet-11)

1	D	18	C	35	B
2	D	19	B	36	A
3	D	20	D	37	D
4	B	21	A	38	C
5	D	22	B	39	D
6	D	23	B	40	D
7	B	24	D	41	B
8	C	25	A	42	D
9	A	26	C	43	D
10	A	27	A	44	B
11	A	28	C	45	B
12	C	29	D	46	C
13	C	30	A	47	D
14	C	31	B	48	C
15	B	32	D	49	B
16	D	33	C	50	D
17	B	34	A		

EXPLANATION**Q.1 Answer is “Water”**

Explanation: Water is effective lubricant that provides protection against damage resulting from friction. For example, tears protect the surface of eye from the rubbing of eyelids, water also forms a fluid cushion around organs that helps to protect them from trauma.

Q.2 Answer is “Polarity, Universal solvent and High specific heat and high heat of vaporization”

Explanation: Biological importance of water is essential for life. There is no existence of life without water. All the almighty has created all living organisms from water. Polarity, universal solvent and high specific heat and high heat of vaporization all are the biological importance of water.

Q.3 Answer is “Heat of vapourization”

Explanation: The heat required to convert one gram of liquid water into vapors at its boiling point is called heat of vapourization.

Q.4 Answer is “10%”

Explanation: It is essential for existence of protoplasm because protoplasm cannot survive if its water content is reduced as low as 10 percent.

Q.5 Answer is “Water expands at high temperature”

Explanation: Water has a unique property, as it expands when temperature falls below 4°C. Water is most heavy at 4°C. therefore ice (solid water) is less dense than liquid water and this is the reason that ice floats in liquid water. Water body freezes on the surface at low temperature. Water has a high surface tension. In living cells this feature of surface tension allows a thin film of water to cover membranes and to keep them moist.

Q.6 Answer is “Specific heat of water”

Explanation: Water has high specific heat. Specific heat is the amount of heat energy required to rise the temperature of one gram of water by one degree celsius.

Q.7 Answer is “Condensation”

Explanation: Condensation is a process in which large organic molecules are synthesized and water molecule is removed.

Q.8 Answer is “Water is not universal solvent”

Explanation: Water is a universal solvent because it can dissolve all polar and ionic substances.

Q.9 Answer is “It is less than water”

Explanation: Water has a unique property, as it expands when temperature falls below 4°C. Water is most heavy at 4°C. Therefore ice (solid water) is less dense than liquid water and this is that ice float is liquid water.

Q.10 Answer is “Hydrophobic properties”

Explanation: Water is polar molecule due to polar nature of water it dissolves almost all type of polar substances.

Q.11 Answer is “Adhesion”

Explanation: Adhesion refers to the tendency of water molecules to be attracted, or “stick”, to other substances. This is a result of the covalent bond between the two hydrogen atoms and the one oxygen atom in the water molecule. Just like a magnet, the poles of water molecule allow it to stick to other polar substances.

Q.12 Answer is “Dehydration synthesis”

Explanation: Because dehydration synthesis is the combination of smaller molecules into the larger molecule with the removal of water.

Q.13 Answer is “Is a universal solvent”

Explanation: Water is a universal solvent. Due to polar nature of water it dissolves almost all type of polar substances and therefore regarded as universal solvent.

Q.14 Answer is “Enzyme”

Explanation: Enzymes being biological catalysts are involved in metabolism going on, in each cell all the time.

Q.15 Answer is “Only a few amino acids”

Explanation: Active site is usually a groove or pocket not a solid compact structure as the rest of the enzyme is, that is why it is made up of only a few amino acids which means some amino acids.

Q.16 Answer is “Bulk of amino acids”

Explanation: Few means “very few” or none at all, however a few is used to indicate “not a large number”. Many amino acids are also not enough to make a three-dimensional globular compact part of enzyme. Thus bulk is true word for it.

Q.17 Answer is “Co-factor”

Explanation: Co-factor which is further sub-categorized into activator, prosthetic group and coenzyme, often contribute directly in enzyme catalysis sometimes it provides a source of chemical energy, helping to drive reactions which would otherwise be difficult or impossible and usually it acts as a bridge between the enzyme and its substrate.

Q.18 Answer is “Prosthetic group”

Explanation: It is organic cofactor which is non-detachable (covalently bonded).

Sr . #	Cofactor	Nature of Bonding	Chemical Composition
1.	Activator	Detachable	Inorganic metallic ions
2.	Prosthetic group	Undetachable/covalent bonded	Organic
3.	Coenzyme	Detachable	Organic derived from vitamins

Q.19 Answer is “Holoenzyme”

Explanation:

Holoenzyme = Apo enzyme + cofactor

Apoenzyme = Holoenzyme – cofactor

Cofactor = Holoenzyme – apoenzyme

Q.20 Answer is “pH temperature and substrate conc.”

Explanation: Both temperature and pH can change the enzyme configuration, thus changing its action, whereas substrate is

that substance which is changed into products with the help of enzyme.

Q.21 Answer is “Pepsin, Pepsinogen”

Explanation: Pepsin being a proteolytic enzyme is considered among potentially damaging enzymes. Thus it is produced in inactive form called pepsinogen and is activated inside the lumen of stomach and wall of stomach is protected by mucus.

Q.22 Answer is “Enzyme”

Explanation: Enzyme being biocatalyst speeds up the biochemical reaction but it itself is not consumed in the reaction. Thus, at the end of biochemical reaction enzyme is obtained unaltered, to be used again.

Q.23 Answer is “ES”

Explanation: When an appropriate enzyme comes together with an appropriate substrate molecule in the same aqueous medium, enzyme substrate complex (ES) is formed.

Q.24 Answer is “In precise order”

Explanation: In a biochemical pathway specific enzymes catalyze the specific steps, thus they should be at specific position, otherwise pathway will not be accomplished.

Q.25 Answer is “Some amino acids”

Explanation: In biology, the active site is the region of an enzyme where substrate molecules bind and undergo a chemical reaction. The active site consists of residues that form temporary bonds with the substrate. The active site is usually a groove or pocket of the enzyme which can be located in a deep funnel within the enzyme or between the interfaces of multimeric enzymes. Being hollow it consists of some amino acids.

Q.26 Answer is “Substrate and binding site of enzyme”

Explanation: Catalytic site of enzyme is activated when a suitable substrate molecule have been chemically bonded with the binding site of an enzyme.

Q.27 Answer is “Lock and key model”

Explanation: According to “Lock and Key Model” the active site of an enzyme is a rigid structure. There is no modification or flexibility in the active site, before, during or after the enzyme action and it is used only as a template.

Q.28 Answer is “Induced Fit Model”

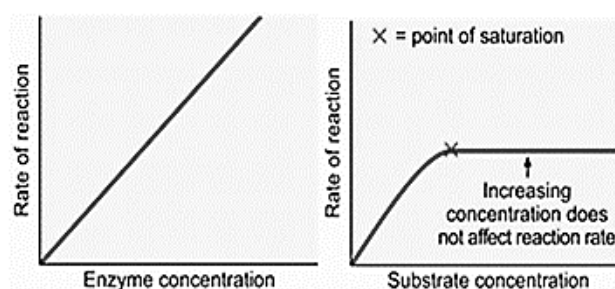
Explanation: Koshland’s Induced Fit model recognizes the flexibility in enzyme structure and in this way an appropriate substrate on coming closer to the enzyme may induce certain changes in the active site of that enzyme to become fit with substrate.

Q.29 Answer is “Specific chemistry and configuration”

Explanation: Any change in chemistry and configuration will change the shape of active site of enzyme and it will become misfit for its substrate.

Q.30 Answer is “Unlimited”

Explanation: Because substrate is that substance which is transformed into product(s) by the action of enzyme.



Q.31 Answer is “More active site”

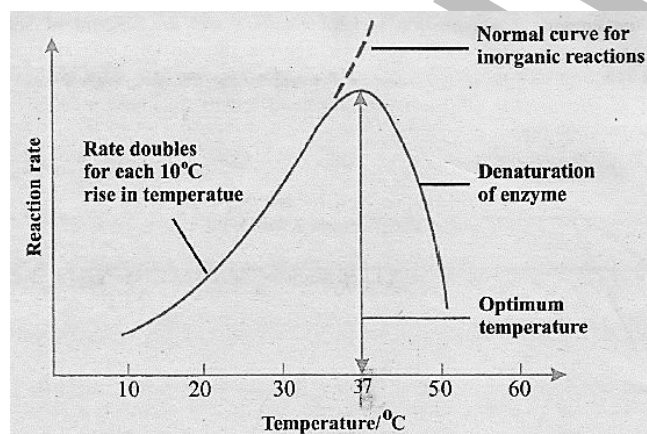
Explanation: Active sites are the active parts of enzyme which act upon a substrate. Thus by increasing the number of enzyme molecules more active sites will be available to act upon substrate molecules.

Q.32 Answer is “Increase for a specific time”

Explanation: Initially the rate will increase as more and more enzyme molecules will be involved in catalysis but soon a saturation stage will come when all the active sites will be occupied. Thus finally the increase in substrate concentration will be of no use without increasing the concentration of enzyme. Please see the graph given in the explanation of question # 23.

Q.33 Answer is “Temperature upto optimum level”

Explanation: Further increase in temperature beyond optimum temperature will start the denaturation of enzyme molecules and as a result the enzyme action will be slowed down.

**Q.34 Answer is “Heat provides activation energy”**

Explanation: Heat increases the kinetic energy of substrate and enzyme molecules which results in an increase in activation energy and as a result rate of enzyme

action increases. Please see the graph given in the explanation of question # 26.

Q.35 Answer is “Increase initially”

Explanation: Initially when temperature is increased from any lower point, the kinetic energy of molecules is increased and as a result the rate of enzyme catalysis also increases. Later on when temperature moves beyond maximum range the movement of molecules will become so violent that they start coming out of the enzyme structure and enzyme denaturation starts consequently.

Q.36 Answer is “Two basic types”

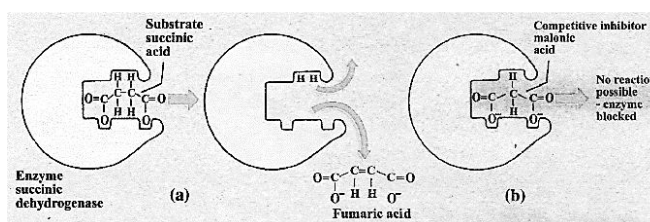
Explanation: Reversible and irreversible inhibitors.

Q.37 Answer is “Non-competitive inhibitors”

Explanation: When change is temporary it is reversible inhibitor and if the inhibitor is changing the enzyme structure as well it cannot compete with substrate for same active site, it is non-competitive inhibitor.

Q.38 Answer is “Fumaric acid”

Explanation: Fumaric acid is a product which is obtained by removing two hydrogen atoms from succinic acid. The reaction is catalyzed by succinic acid dehydrogenase enzyme.

**Q.39 Answer is “No reaction possible, Enzyme is blocked”**

Explanation: Malonic acid is a competitive reversible inhibitor of succinic acid substrate and it blocks the succinic acid dehydrogenase enzyme.

Q.40 Answer is “Enzyme and Co-enzyme”

Explanation: Both enzyme and co-enzyme are obtained unaltered at the end of reaction and remain available again for use.

Q.41 Answer is “Pepsin”

Explanation: Pepsin being proteolytic enzyme is a potentially damaging enzyme having capability to digest the gut wall as well as to the that cell which is secreting it. Thus it is secreted in inactive form.

Q.42 Answer is “E”

Explanation: The end product of last reaction in a chain of biochemical reactions controls the entire pathway either positively (by feedback activation) or negatively (by feedback inhibition)

Q.43 Answer is “Feedback inhibition”

Explanation: Cell have limited space thus product should be produced according to need. The excess cause storage disorders. Thus upon accumulation of end products, the pathway is inhibited from first step and this is called feedback inhibition and vice versa.

Q.44 Answer is “Feedback activation”

Explanation: In a chain of biochemical reaction, if the end product of last reaction is deficient, the first step in the pathway is activated.

Q.45 Answer is “Koshland”

Explanation: On the basis of new evidences Koshland (1959) proposed its modified form.

Q.46 Answer is “6.80”

Explanation:

Enzyme	Optimum pH
Pepsin	2.00
Sucrase	4.50
Enterokinase	5.50
Salivary amylase	6.80
Catalase	7.60
Chymotrypsin	7.00-8.00
Pancreatic lipase	9.00
Arginase	9.70

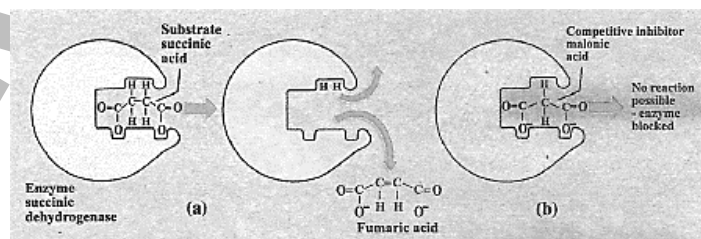
Q.47 Answer is “9.00”

Explanation:

Enzyme	Optimum pH
Pepsin	2.00
Sucrase	4.50
Enterokinase	5.50
Salivary amylase	6.80
Catalase	7.60
Chymotrypsin	7.00-8.00
Pancreatic lipase	9.00
Arginase	9.70

Q.48 Answer is “Succinic dehydrogenase”

Explanation:



Q.49 Answer is “Extreme pH change”

Explanation: Extreme changes in pH cause the bonds in the enzymes to break, resulting in the enzyme denaturation.

Q.50 Answer is “Catalyst”

Explanation: Glossary Page # IV, Book – I.

STOP

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