BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Bachelor of Science (Honours) in Biotechnology

Course Name – Enzymology

Course Code - BBTS301B

Semester / Year - Semester III

Time allotted : 75 Minutes Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 60=60

1. *(Answer any Sixty)*

(i) Induced fit theory for the formation of Enzyme-Substrate complex was proposed by

a) Koshland b) Charles Leibeg

c) Buchner d) Fischer

(ii) Non-protein organic part of the enzyme is

a) Co-factor b) Co-enzyme

c) Apo enzyme d) Isoenzyme

(iii) An enzyme was crystallized for the first time by

a) John Northrop b) Edward Buchner

c) J.B. Sumner d) None

(iv) Catalytic strategy of chymotrypsin enzyme includes

a) Covalent catalysis & metal ion catalysis b) Metal ion catalysis & Acid base catalysis

c) Covalent catalysis & acid base catalysis d) None of these

(v) Lower value of Km indicates

a) higher affinity of the enzyme with substrate b) lower affinity of the enzyme with substrate

c) no effect on the enzyme affinity with substrate

d) None of these

(vi) Name the coenzyme of riboflavin (B2)?

a) NAD or NADP

b) FAD and FMN

c) Coenzyme A

d) Thiamine pyrophosphate

(vii) Name the enzyme secreted by pancreas?

a) Pepsin

b) Chymotrypsin

c) Trypsin

d) Alcohol dehydrogenase

(viii) Name the enzyme which catalyzes the oxidation-reduction reaction?

a) Transaminase

b) Glutamine synthetase

c) Phosphofructokinase

d) Oxidoreductase

(ix) What is the function of phosphorylase?

a) Transfer inorganic phosphate

b) Transfer a carboxylate group

c) Use H2O2 as the electron acceptor

d) Transfer amino group

(x) Which of the following reactions is catalyzed by Lyase?

a) Breaking of bonds

b) Formation of bonds

c) Intramolecular rearrangement of bonds

d) Transfer of group from one molecule to another

(xi) What is the binding energy?

a) Free energy released in the formation of enzyme-substrate interaction

b) The energy required to form a bond

c) The energy required to bind substrate

d) It is the activation energy

(xii) Which of the following options is not an example of irreversible enzyme inhibitor?

a) Cyanide
b) Sarin
c) Diisopropyl phosphoflouridate (DIPF)
d) Statin drugs

(xiii) Lineweaver-Burk plot is also known as

a) Double reciprocal plot
b) Hanes-Woolf plot
c) Eadie-Hofstee plot
d) Steady-state equation

(xiv) What is an Isozyme?

a) Same structure, different function
b) Different structure, the same function
c) Same structure, the same function
d) Different structure, different function

(xv) Name an enzyme that is derived from the stomachs of young ruminant animals and also used in dairy industry to produce cheese?

a) Trypsin
b) Pepsin
c) Liginase
d) Rennin

(xvi) Name an enzyme which is not proteinaceous in nature?

a) Cellulases
b) Xylanases
c) Ribozyme
d) Peptidiase

(xvii) Inactive enzymes which are not bound to their cofactors are called

a) Apoenzymes
b) Coenzymes
c) Enzyme inhibitors
d) Holoenzymes

(xviii) The ‘lock and key hypothesis’ mechanism is related with:

a) Digestion of fat in the body
b) For enzyme specificity
c) For the formation of vacuole
d) Explosives

(xix) The catalytic activity of two different enzymes can be compared by the

a) Km value
b) pH of optimum value
c) molecular size of the enzyme
d) formation of the product

(xx) An uncompetitive inhibitor of an enzyme catalyzed reaction

a) is without effect at saturating substrate concentration
b) can actually increase reaction velocity in rare cases
c) binds to the Michaelis complex and decreases Vmax
d) All of these

(xxi) Which of the following statements about enzymes or their function is true?

a) Enzymes do not alter the overall change in free energy for a reaction
b) Enzymes are proteins whose three-dimensional form is key to their function
c) Enzymes speed up reactions by lowering activation energy
d) All of these

(xxii) Consider this reaction. A + B --> C + D + energy.

a) This reaction is exergonic
b) An enzyme could still speed the reaction
c) A and B are reactants; C and D are products
d) All of these are correct

(xxiii) When the velocity of enzyme activity is plotted against substrate concentration, which of the following is obtained?

a) Hyperbolic curve
b) Parabola
c) Straight line with positive slope
d) Straight line with negative slope

(xxiv) The rate determining step of Michaelis-Menten kinetics is

a) The complex dissociation step to produce products
b) The complex formation step
c) The product formation step
d) None of these

(xxv) The molecule which acts directly on an enzyme to lower its catalytic rate is

a) Repressor
b) Inhibitor
c) Modulator
d) Regulator

(xxvi) Which of the following is an example for irreversible inhibitor?

a) Disulfiram
b) Oseltamivir
c) Protease inhibitors
d) DIPF

(xxvii) Which of the following is an example of reversible inhibitor?

a) DIPF
b) Penicillin
c) Iodoacetamide
d) Protease inhibitors

(xxviii) Where does inhibitor bind on enzyme in mixed inhibition?

a) At active site
b) Allosteric site
c) Does not bind on enzyme
d) Binds on substrate

(xxix) What is the general mechanism of an enzyme?

a) It acts by reducing the activation energy
b) It acts by increasing the activation energy
c) It acts by decreasing the pH
d) It acts by increasing the pH

(xxx) Which of the following options is false about allosteric feedback inhibition?

a) Bacterial enzyme system is the first known example
b) Conversion of L-leucine to L-isoleucine
c) Threonine dehydratase is inhibited by isoleucine
d) If the isoleucine concentration decreases, the rate of threonine dehydration increases?

(xxxi) Which of the following reactions is catalyzed by Lyase?

a) Breaking of bonds
b) Formation of bonds
c) Intramolecular rearrangement of bonds
d) Transfer of group from one molecule to another

(xxxii) Which of the following is INCORRECT for the lock-and-key model?

a) It is used to describe the binding process
b) The active site of the enzyme is

complementary to the substrate

c) It demonstrates enzyme-substrate complex

d) The binding of the substrate produces a conformational change in enzyme

(xxxiii) Which of the following options is not a catalytic strategy for an enzyme to perform specific reaction?

a) Covalent catalysis

b) Metal ion catalysis

c) Michaelis constant

d) Acid-base catalysis

(xxxiv) Name the enzyme which is found in tears, sweat, and an egg white?

a) Ribozyme

b) Lysozyme

c) Zymoge

d) Isozymes

(xxxv) Which of the following enzymes catalyzes a reaction that introduces reduced nitrogen ito cellular metabolism?

a) Bacterial glutamine synthase

b) Bacterial dinitrogenase reductase

c) Bacterial dinitrogenase oxidase

d) Phosphatase

(xxxvi) The catalytic activity of two different enzymes can be compared by the

a) Km value

b) pH of optimum value

c) molecular size of the enzyme

d) formation of the product

(xxxvii) Which of the following options is false?

a) Allosteric modulators may be inhibitory or stimulatory

b) Based on the nature of modulator, allosteric enzymes are of two types

c) Homotropic allosteric enzymes have the substrate and modulator same

d) Heterotropic allosteric enzymes have the substrate and modulator same

(xxxviii) Which of the following statements about enzymes or their function is true?

a) Enzymes do not alter the overall change in free energy for a reaction

b) Enzymes are proteins whose three-dimensional form is key to their function

c) Enzymes speed up reactions by lowering activation energy
d) All of these

(xxxix) Which of the statement is true regarding Km

a) It is the measure of the stability of the ES complex
b) It is the measure of the stability of the affinity of an enzyme for its substrate
c) A high Km indicates weak substrate binding
d) All of these are correct

(xl) A _____is a biocatalyst that increases the rate of the reaction without being changed

a) Aluminum oxide
b) Silicon dioxide
c) Enzyme
d) Hydrogen peroxide

(xli) Name the enzyme which catalyzes the oxidation-reduction reaction

a) Transaminase
b) Glutamine synthetase
c) Phosphofructokinase
d) Oxidoreductase

(xlii) Mark the CORRECT function of enzyme, Peptidase?

a) Cleave phosphodiester bond
b) Cleave amino bonds
c) Remove phosphate from a substrate
d) Removal of H2O

(xliii) Which of the following reaction is catalyzed by Lyase?

a) Breaking of bonds
b) Formation of bonds
c) Intramolecular rearrangement of bonds
d) Transfer of group from one molecule to another

(xliv) Which of the following is an example of ligases enzyme

a) Mutases
b) Epimerases
c) Racemases
d) Carboxylases

(xlv) What is the binding energy ?

a) Free energy released in the formation of enzyme-substrate interaction
b) The energy required to form a bond
c) The energy required to bind substrate
d) It is the activation energy

(xlvi) Which of the following is not a catalytic strategy for an enzyme to perform specific reaction?

a) Covalent catalysis
b) Metal ion catalysis
c) Michaelis constant
d) Acid-base catalysis

(xlvii) What is the location of alcohol acetyltransferase?

a) Lysosomes
b) Microsomes
c) Peroxisomes
d) ER

(xlviii) Which of the following enzyme is present in the plasma membrane?

a) Invertase
b) Melibiase
c) Steryl-ester hydrolase
d) Hexokinase

(xlix) Which of the following is false about allosteric feedback inhibition?

a) Bacterial enzyme system is the first known example
b) Conversion of L-leucine to L-isoleucine
c) Threonine dehydratase is inhibited by isoleucine
d) If the isoleucine concentration decreases, the rate of threonine dehydration increases

(l) Which is the inducer of enzyme invertase?

a) Starch
b) Sucrose
c) Galactosidases
d) Fatty acids

(li) Which of the following enzymes catalyze the ADP-ribosylation of key cellular enzymes or proteins?

a) Diphteria toxin and cholera toxin
b) Dinitrogenase reductase

c) Protein phosphatases
d) Kinase

(lii) Removal of phosphoryl groups is catalyzed by

a) Diphteria toxin and cholera toxin
b) Dinitrogenase reductase
c) Protein phosphatases
d) Protein kinases

(liii) Which of the following is false?

a) Allosteric modulators may be inhibitory or stimulatory
b) Based on the nature of modulator, allosteric enzymes are of two types
c) Homotropic allosteric enzymes have the substrate and modulator same
d) Heterotropic allosteric enzymes have the substrate and modulator same

(liv) In the case of allosteric enzymes what is the graphical representation when initial velocity is plotted against substrate concentration?

a) Straight line with negative slope
b) Hyperbola
c) Sigmoid curve
d) Parabola

(lv) Which is the enzyme that acts as a regulatory enzyme in a four-step metabolic pathway?

a) First enzyme
b) Fourth enzyme
c) Second enzyme
d) Third enzyme

(lvi) Which of the following does not produces “Proteases”?

a) Bacillus
b) Rhizopus
c) Mucor
d) Bacillus coagulans

(lvii) Which of the following is not included in immobilization process?

a) Absorption
b) Adsorption
c) Entrapment
d) Affinity

(lviii) Which of the following is not an upstream process?

a) Selection of a suitable enzyme
b) Process development
c) Concentration and primary purification of enzymes
d) Large scale production

(lix) Which of the following purified enzyme is used in pharmaceutical industry?

a) Subtilisin
b) Novozym-435
c) Bromelain
d) Asparaginase

(lx) Which type of fermentation is used for large scale manufacturing of enzymes?

a) Solid-state fermentation
b) Submerged fermentation
c) Solid-Gas state fermentation
d) Gas-state fermentation