



Islamabad Model College for Boys H-9, Islamabad

Home Assignment during Pandemic Closure November – December 2020

Note: - Submission Date is first week after January 11, 2021 or whenever the college will re-open.

Class: 1st Year Pre-medical **Subject:** Biology

Assignment for Week 1

Q1) Short Questions:

- i) (a) Generally, enzymes belong to which group of biomolecules? **(01)**
(b) How ribozymes are chemically different from rest of enzymes? Also give an example of such enzymes. **(02)**
- ii) Explain briefly the composition and function of active site of enzyme. **(03)**
- iii) What is the role of co-factor in enzymes activity? **(03)**
- iv) Differentiate between apoenzymes and holoenzymes and example of each. **(03)**
- v) Keeping the pepsinogen and pepsin in mind, explain briefly the concept of apoenzymes and holoenzymes. **(03)**
- vi) Define the terms: activator, co-enzyme and prosthetic group with examples. **(03)**
- vii) Write any three features of Lock and Key Model of enzymes action. **(03)**
- viii) Write any three features of Induced Fit Model of enzymes action. **(03)**
- ix) Write any three differences between Lock & Key Model and Induced Fit Model of enzymes action **(03)**
- x) Why enzymes that follow lock & key model are also called non-regulatory enzymes **(03)**
- xi) What is enzyme inhibition? How do enzyme inhibitors appear in the metabolic systems? **(03)**
- xii) Write any three characteristics of competitive inhibitors OR Explain briefly the mode of action of competitive inhibitors **(03)**
- xiii) Draw a labelled diagram showing the mode of action of competitive inhibition. **(03)**
- xiv) Write any three characteristics of non-competitive inhibitors OR Explain briefly the mode of action of non-competitive inhibitors **(03)**
- xv) Draw a labelled diagram showing the mode of action of non-competitive inhibition. **(03)**
- xvi) What is malonate? How does it inhibit the enzyme activity? **(03)**
- xvii) What is the importance/significance of competitive inhibition? **(03)**
- xviii) Write any three differences between competitive inhibitors and non-competitive inhibitors. **(03)**
- xix) Explain briefly the mechanism of feedback inhibition. **(03)**

- xx)** Draw the concept of feedback inhibition by showing the threonine biosynthetic pathway? **(03)**

Q2) Long Questions

- i)** Describe the mechanism of enzyme action according to Lock & Key Model and Induced Fit Model. Also draw the labelled diagrams. **(10)**
- ii)** What is enzyme inhibition? Describe the mode of action of competitive and non-competitive inhibitors with examples. Also draw the labelled diagrams. **(10)**

Assignment for Week 2

Q1) Short Questions:

- i)** What is electromagnetic spectrum, which range of this spectrum is effective for the process of photosynthesis? **(03)**
- ii)** Explain briefly, what determines the effectiveness of light for the process of photosynthesis. **(03)**
- iii)** What is action spectrum? How it could be determined for a particular plant? **(03)**
- iv)** How the light energy is utilized after its absorption in photosystem? **(03)**
- v)** What is a pigment? How the color of a particular pigment is determined? **(03)**
- vi)** Name the types of photosynthetic pigments and specify their particular colors **(03)**
- vii)** Write any three differences between chlorophyll-a and chlorophyll-b. **(03)**
- viii)** Write any three differences between head and tail of chlorophyll molecule. **(03)**
- ix)** What is absorption spectrum? How the absorption spectra of chlorophyll and carotenoids differ from each other? **(03)**
- x)** Explain briefly, the structure of a photosystem. **(03)**
- xi)** What is difference between antenna complex and reaction center of a photosystem? **(03)**
- xii)** What is the role of CO₂ in photosynthesis and is it obtained? **(03)**
- xiii)** Outline the role of water in photosynthesis. **(03)**
- xiv)** Define Van Niel's hypothesis. State on what basis, it was formulated? **(03)**
- xv)** How the Van Niel's hypothesis was experimentally confirmed? OR Give the experimental evidence of Van Niel's hypothesis. **(03)**
- xvi)** What are the inputs and outputs of light and dark reactions of photosynthesis? **(03)**
- xvii)** What are the products of light reaction and how are they used in dark reaction? **(03)**
- xviii)** What is photolysis? How does it occur? **(03)**
- xix)** What are the sites of light and dark reactions of photosynthesis in plant body? **(03)**
- xx)** Outline any three events that must occur during the light reaction. **(03)**

Q2) Long Questions

- i) Describe the mechanism of non-cyclic photophosphorylation (Z-scheme) also draw its pathway. **(10)**
- ii) Describe the pathway of Calvin cycle and its labeled diagram. **(10)**

Assignment for Week 3

Q1) Short Questions:

- i) Name the components of electron transport chain of light dependent phase that is involved in electron flow from PS-II to PS-I in non-cyclic photophosphorylation. **(03)**
- ii) Name the components of electron transport chain of light dependent phase that is involved in electron flow from PS-I to NADP⁺ in non-cyclic photophosphorylation. **(03)**
- iii) Name the components of electron transport chain of light dependent phase that is involved in electron flow cyclic photophosphorylation. **(03)**
- iv) Why the pathway of non-cyclic photophosphorylation is called Z-scheme? **(03)**
- v) Write any three difference between non-cyclic and cyclic photophosphorylation. **(03)**
- vi) Name the metabolic pathways that occur in the light independent phase of photosynthesis. **(03)**
- vii) Why the first phase of Calvin cycle is called carbon fixation? **(03)**
- viii) What do you know about RuBisCo? Write any three properties. **(03)**
- ix) What are the reactants and products of carbon fixation step of Calvin cycle? **(03)**
- x) Why the second step of Calvin cycle is called designated as reduction, however, it involves three events i.e., phosphorylation, reduction and dephosphorylation? **(03)**
- xi) What is CO₂ acceptor molecule in Calvin cycle? How it is regenerated? **(03)**
- xii) Outline the steps of aerobic respiration. **(03)**
- xiii) Write any one reaction of glycolysis that involves the consumption of ATP. **(03)**
- xiv) Write any one reaction of glycolysis that involves substrate level phosphorylation. **(03)**
- xv) The glycolysis pathway comprises two phases, give their names and products. **(03)**
- xvi) How pyruvates are oxidatively decarboxylated before they enter the Krebs cycle? **(03)**
- xvii) Why the oxidation of pyruvate step is also called as link reaction? **(03)**
- xviii) Write any one reaction of Krebs cycle that involves substrate level phosphorylation. **(03)**
- xix) Why the Krebs cycle is also known as Tricarboxylic acid (TCA) cycle? **(03)**
- xx) Write any one reaction of Krebs cycle that involves oxidative decarboxylation. **(03)**

Q2) Long Questions

- i) Describe the mechanism of glycolysis also draw its pathway. **(10)**
- ii) Describe the pathway of Krebs cycle and its labeled diagram. **(10)**