REVISION WORKSHEET: Topics B and C: BIOMOLECULES & ENZYMES

Core Idea 1 – The Cell and Biomolecules of Life Key Words / Phrases

(g) **Describe** the structure and properties of the following monomers:

i. α -glucose and β -glucose (in carbohydrates)

Structure	Properties

ii. glycerol and fatty acids (in lipids)

Structure	Properties

iii. amino acids (in proteins) (knowledge of chemical formulae of specific R-groups of different amino acids is not required)

Structure	Properties



- (h) **Describe** the <u>formation</u> and <u>breakage</u> of the following bonds (show diagram):
 - i. glycosidic bond

Formation:

Breakage:

ii. ester bond

Formation:

Breakage:

iii. peptide bond

Formation:

Breakage:



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- (i) **Describe** the structures and properties of the following biomolecules and explain how these are related to their roles in living organisms:
 - i. starch (including amylose and amylopectin)
 - ii. cellulose
 - iii. glycogen

Carbohydrates	Structure	Functions
Starch (storage)		
Glycogen (Storage)		
Cellulose (structural)		



- iv. triglyceride
- v. phospholipid

Lipids	Structure	Function
Triglyceride		
Phospholipid		

(m) **Explain** primary structure, secondary structure, tertiary structure and quaternary of proteins, and describe the types of bonds that hold the molecule in shape (hydrogen, ionic, disulfide and hydrophobic interactions)

Protein structure	Definition	Bonds present (between?)
Primary		
Secondary		
Tertiary		
Quaternary		



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- (n) **Explain** the effects of temperature and pH on protein structure *(write on a separate paper)*
- (o) **Describe** the molecular structure of the following proteins and explain how the structure of each protein relates to the function it plays:
 - i. haemoglobin (transport)
 - ii. collagen (structural)
 - iii. G-protein linked receptor (signalling)

(Knowledge of details of the number of amino acids and types of secondary structures present is not required)

Haamaglahin	
Collagen	
G-protein	
linked receptor	
(signaling)	



(p) Explain the <u>mode of action</u> of enzymes in terms of an active site, enzyme-substrate complex, lowering of activation energy and enzyme specificity using the lock-and-key and induced-fit hypotheses.

In other words, how do enzymes catalyze substrates? Your answer should include the key words in bold.

(q) Investigate and explain the effects of temperature, pH, enzyme concentration and substrate concentration of an enzyme-catalysed reaction by measuring rates of formation of products (e.g. measuring gas produced using catalase) or rate of disappearance of substrate (e.g. using amylase, starch and iodine).

Factor	Effect on enzyme-catalyzed rate of reaction (Pls draw graph sketch)
Temperature	



рН		
Enzyme concentration		
Substrate concentration		



(r) **Describe** the structure of competitive and non-competitive inhibitors with reference to the binding sites of the inhibitor.
Competitive inhibitors:

Non-competitve inhibitors:

(s) **Explain** the effects of competitive and non-competitive inhibitors (including allosteric inhibitors) on the rate of enzyme activity.

Competitive	
inhibitors	
Non-	
competitive	
inhibitors	
Allosteric	
inhibitors	