**Extended Response –Answer Key**

**Polymer Option #1 Total - (20 marks)**

Using examples, describe ‘addition polymers’ and ‘condensation polymers’ (including polyesters and polyamides).

Your answer should include:

* an explanation of the term ‘polymer’
* the structure and name of an example of type of polymer (including polyesters and polyamides)
* structures of starting materials for each example of a polymer type
* polymerisation reactions

1. Polymer is large molecule made from combination of many small molecules (monomers)

**Addition polymers**

1. Description of how they are formed (e.g. alkene monomers do addition)
2. Name of an addition polymer
3. Structure of addition polymer
4. Monomer for addition polymer
5. Reaction for addition polymer

**Condensation polymers**

1. Formed from condensation reaction between COOH and –OH or –COOH and –NH2.
2. Name of a polyester
3. Structure of polyester
4. Monomer for polyester
5. Reaction for addition polymer
6. Name of a polyamide
7. Structure of polyamide
8. Monomer for polyamide
9. Reaction for addition polyamide

**(15 marks)**

**General writing quaility**

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| --- | --- | --- |
| **Quality of writing** | Characteristics of excellent answer:   * Well organized ideas that flow easily * Good use of vocabulary, including relevant scientific terms * Use of subheadings and paragraphs to effectively order ideas * Concise language – lack of needless repetition * Legible writing with minimal spelling errors | **5 marks** |

**Amino acids Total - (20 marks)**

“Amino acids are an important category of organic molecules. Discuss the chemistry of amino acids, including:

* The chemical structure of amino acids, including alpha- amino acids
* The effect of pH on the structure of amino acids
* How this structure is linked to the physical properties of amino acids ( i.e. melting point and solubility)
* How amino acids are able to form long polypeptide chains”

1. General structure of amino acid
2. Explanation of what is meant by **alpha**-amino acid
3. Forms zwitterions in neutral solution
4. Forms positive ions in acidic solution
5. Forms negative ions in basic solution
6. Ionic bonding between zwitterions
7. Higher melting and boiling point than other organic substances
8. ------ due to ionic bonding being stronger than intermolecular forces
9. Soluble in water
10. ------ due to formation of strong ion-dipole forces between +/- ion charges and water molecules
11. Insoluble in non-polar solvents
12. ------- due to dispersion forces between solute and solvent being weaker than ionic bonding in solid
13. Undergoes condensation reactions with other amino acids
14. -------- which links the chains via an amide/ peptide group
15. Equation for condensation reaction

**(15 marks)**

**General writing quaility**

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| --- | --- | --- |
| **Quality of writing** | Characteristics of excellent answer:   * Well organized ideas that flow easily * Good use of vocabulary, including relevant scientific terms * Use of subheadings and paragraphs to effectively order ideas * Concise language – lack of needless repetition * Legible writing with minimal spelling errors | **5 marks** |