Chemistry

Higher level

Paper 1B

Practice paper

Topic: Models to Materials (HL)

1. The properties of materials are linked to their position on the bonding continuum (Section 17 of the IB Data Booklet).

(a) Using Section 17, deduce the bonding coordinates (average electronegativity and difference) for Gallium Arsenide (GaAs). **[2]**

.....
.....
.....
.....

(b) GaAs is a semiconductor. Based on its position in the triangle, explain how its bonding character differs from that of pure Silicon. **[3]**

.....
.....
.....
.....
.....
.....

2. The environmental sustainability of polymers is often determined by their susceptibility to chemical hydrolysis.

(a) Compare the chemical stability of the C-C backbone in polyethene with the ester linkage in Terylene (PET) when exposed to environmental moisture. **[2]**

.....
.....
.....
.....

(b) Deduce the structures of the organic products formed by the acid-catalyzed hydrolysis of the polyamide Nylon 6,6. **[3]**

.....
.....
.....
.....
.....
.....

3. The high-strength polymer Kevlar is formed by the reaction of 1,4-benzenedicarboxylic acid and 1,4-diaminobenzene.

(a) Draw the structure of the amide linkage (peptide bond) that forms between the monomers. **[1]**

(b) Explain how the presence of the aromatic rings and the amide groups contribute to the extreme tensile strength of Kevlar. **[3]**

.....
.....
.....
.....
.....
.....