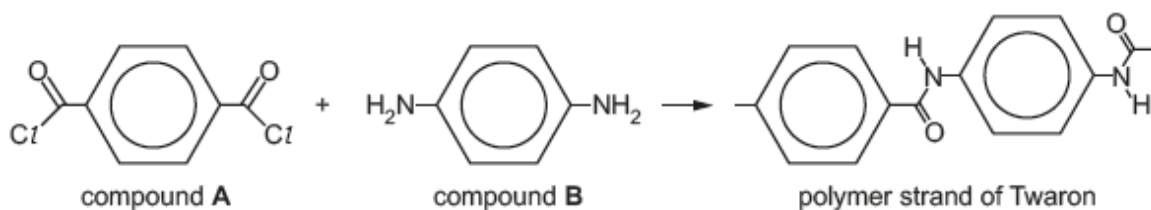


A Level Chemistry B (Salters)
H433/02 Scientific literacy in chemistry

Question Set 11

1 Twaron™ is a polymer used to make body armour.

The polymer strands are made using the reaction in **Fig. 1.1**.



(a) Name the **functional groups** in compounds **A** and **B**.

A.....

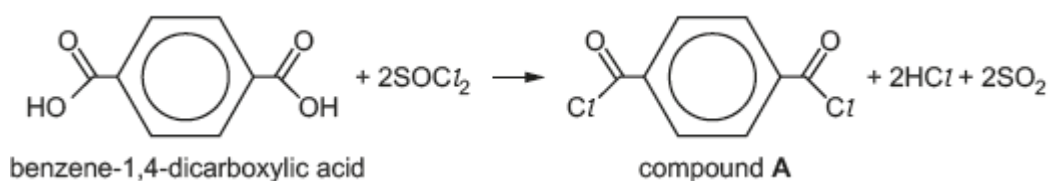
B..... [2]

(b) Suggest the $\text{O}=\overset{\wedge}{\text{C}}-\text{Cl}$ bond angle in compound **A**.

Explain your answer.

[3]

(c) Compound **A** can be made by the reaction in **Fig. 1.2**.

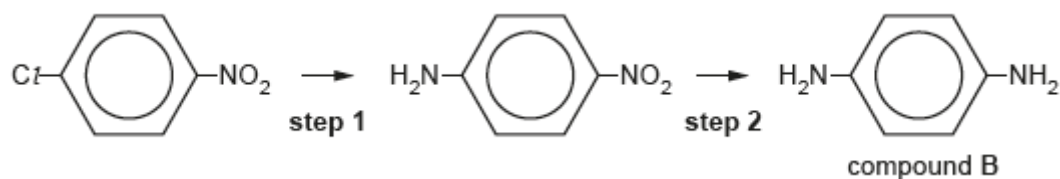


Calculate the mass of compound **A** that can be made from 32 g of benzene-1,4-dicarboxylic acid if the yield is 67%.

Give your answer to the nearest whole number.

mass of compound **A** = g [2]

- (d) A synthetic route for making compound **B** is shown in **Fig. 1.3**.



Use your chemical knowledge and the Data Sheet to suggest possible reagents for **steps 1 and 2**.

Step 1.....

Step 2

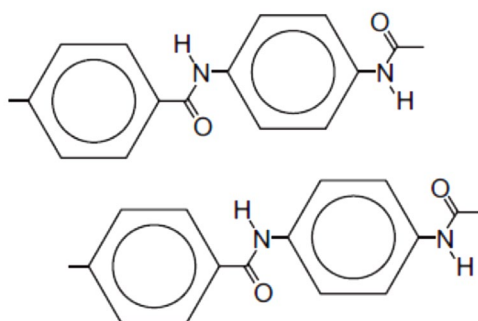
[2]

- (e) (i) The polymer strands link together by intermolecular bonds when they are spun to form Twaron. This gives the fabric its tough quality.

Name the strongest intermolecular bonds that can form between the chains.

[1]

- (ii) Mark the positions of the intermolecular bonds by drawing dotted lines on the diagram below.



[1]

- (f) (i) A Twaron polymer strand is hydrolysed.

State the conditions that could be used to hydrolyse the polymer.

[1]

- (ii) Draw the formulae of the **two** organic products of hydrolysis in the boxes.

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[2]

Total Marks for Question Set 11: 14

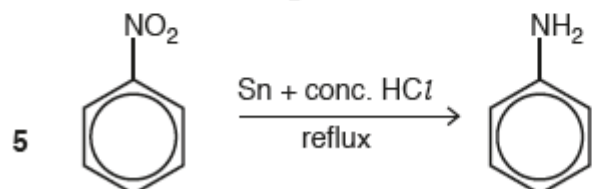
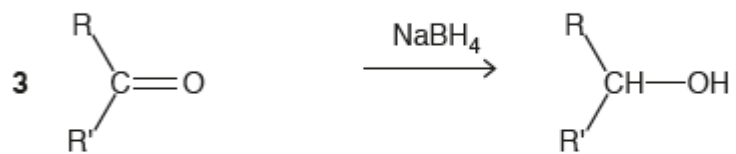
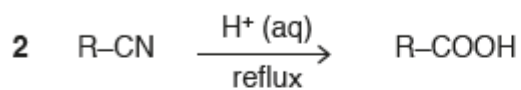
Resource Materials

Question Set No: 11

The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)												
		Key																											
		atomic number																											
		Symbol																											
		name																											
		relative atomic mass																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18												
1 H hydrogen 1.0	2 He helium 4.0	3 Li lithium 6.9	4 Be beryllium 9.0	5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2	11 Na sodium 23.0	12 Mg magnesium 24.3	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9												
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8												
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3												
55 Cs caesium 132.9	56 Ba barium 137.3	57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon												
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	114 Fl flerovium	116 Lv livermorium																
57 La lanthanum 138.9	58 Ce cerium 140.1	59 Pr praseodymium 140.9	60 Nd neodymium 144.2	61 Pm promethium	62 Sm samarium 150.4	63 Eu europium 152.0	64 Gd gadolinium 157.2	65 Tb terbium 158.9	66 Dy dysprosium 162.5	67 Ho holmium 164.9	68 Er erbium 167.3	69 Tm thulium 168.9	70 Yb ytterbium 173.0	71 Lu lutetium 175.0	89 Ac actinium 227.0	90 Th thorium 232.0	91 Pa protactinium	92 U uranium 238.1	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No nobelium	103 Lr lawrencium

Some useful organic reactions



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