

01. 0620\_p20\_ms\_40 Q: 1

- (a) A [1]
- (b) D and F note: both needed for mark [1]
- (c) E [1]
- (d) B [1]
- (e) C [1]
- 

02. 0620\_p20\_ms\_40 Q: 3

- (a) (i) 6e between two nitrogen atoms; note: can be any combination of dots or crosses [1]  
1 lone pair on each nitrogen atom; [1]
- (ii)
- |           |                          |                                  |     |
|-----------|--------------------------|----------------------------------|-----|
|           | solid                    | gas                              |     |
| pattern:  | regular / lattice        | random / irregular / no pattern; | [1] |
| distance: | close                    | far apart / spread out;          | [1] |
| movement: | vibrate / fixed position | moving;                          | [1] |
- note: comparison must be made
- (b) particles have more energy / move faster; [1]  
collide harder / collide more frequently / more collisions / collide with more force; [1]  
allow: molecules instead of particles
- (c) (i) nitrogen has smaller  $M_r$ ; [1]  
nitrogen (molecules) move faster (than chlorine molecules) / ora; [1]  
note: comparison must be made
- (ii) (at higher temperature) molecules move faster / have more energy [1]
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Paper Perfection, Crafted With Passion

03. 0620\_s19\_ms\_41 Q: 2

(a)	80(°C) (1)	1
(b)	horizontal line from end of graph at minute 9 to minute 11 (1)	1
(c)	energy is used to break bonds / overcome attraction (1) between molecules (1)	2

(d)	vibrations (1) increase (1)	2
(e)	melting point decreases (1) boiling point increases (1)	2
(f)	decrease from 120 °C to 80 °C and horizontal line at 80 °C (1) decrease from horizontal line to finish at 20 °C at 8 mins (1)	2

04. 0620\_w16\_ms\_41 Q: 1

(a)	<b>H</b>	1
(b)	<b>G</b>	1
(c)	filtration	1
(d)	fractional distillation	1 1
(e)	add / mix / stir / dissolve / shake / heat with water filter / decant heat (filtrate) or (leave filtrate to) evaporate	1 1 1
(f)	electrons (electrons) move / flow (throughout structure)	1 1

05. 0620\_w16\_ms\_43 Q: 1

(a)	proton	+1	1	2
	neutron	0	1	
	electron	-1	$\frac{1}{1840}$	
(b)(i)	(same) number of protons and electrons /6 protons and six electrons (different) neutron (number)/6,7 and 8 neutrons			2 1
(b)(ii)	same <u>number</u> of electrons / electron configuration			1
(c)	diamond <i>and</i> graphite			1
(d)	two double bonds with no extra electrons on the carbon atoms			1
	both oxygen atoms with four non-bonding electrons			1

06. 0620\_s15\_ms\_32 Q: 2

(a)	E; high melting point/ mp /mpt <b>OR</b> high boiling point/bp/bpt; poor/non conductor (when liquid and/or solid);	3	I mpt/bpt above room temp
(b)	B; (good) conductor when <u>solid</u> (and liquid);	2	A (good) conductor in any state/both states I high melting point/boiling point R low melting point/boiling point
(c)	A; melting point/ $-7^{\circ}\text{C}$ is below room temperature/ $25^{\circ}\text{C}$ /RTP ora; boiling point/ $59^{\circ}\text{C}$ is above room temperature/ $25^{\circ}\text{C}$ /RTP ora;	3	I low melting point/boiling point /conductivity  25( $^{\circ}\text{C}$ )/room temperature/RTP is in between $-7^{\circ}\text{C}$ and $59^{\circ}\text{C}$ <b>OR</b> 25( $^{\circ}\text{C}$ )/room temperature/RTP is between mpt and bpt would both score the 2 evidence marks
(d)	C; high melting point/ mp /mpt <b>OR</b> high boiling point/bp/bpt;  <b>BOTH</b> poor/non conductor when solid <b>and</b> good conductor when liquid <b>OR</b> molten/ only conduct when liquid;	3	A melting point <b>and</b> boiling point both above room temp / $25^{\circ}\text{C}$ /RTP  I conducts when aqueous or in solution I conducts in liquid due to free electrons

07. 0620\_w15\_ms\_31 Q: 6

(a)(i)	any three from: <ul style="list-style-type: none"> <li>each oxygen is joined to two silicons / atoms;</li> <li>each silicon is joined to four oxygens / atoms;</li> <li>tetrahedral (around silicon)/similar to diamond;</li> <li>linear around oxygen;</li> </ul>	3
(a)(ii)	any three from: <ul style="list-style-type: none"> <li>high melting point / boiling point;</li> <li>hard;</li> <li>strong;</li> <li>(colourless) crystalline (solid);</li> <li>brittle / not malleable;</li> <li>poor / non-conductor (of electricity) / insulator;</li> <li>insoluble (in water);</li> </ul>	3
(a)(iii)	SiO <sub>2</sub> reacts with or dissolves in or neutralises an acid or acidic oxide; SiO <sub>2</sub> does not react or dissolve in or neutralise an alkali or base or basic oxide;	1 1
(b)	carbon dioxide has a simple molecular structure;	1

08. 0620\_w14\_ms\_31 Q: 2

- (a) soft because weak forces between layers/sheets/rows [1]  
 layers can slip/slide [1]  
 good conductor because electrons can move/mobile [1]
- (b) it is soft: pencils **or** lubricant **or** polish [1]  
 good conductor: electrodes **or** brushes (in electric motors) [1]
- (c) (i) every silicon atom is bonded/attached to 4 oxygen atoms or every oxygen bonded/attached to two silicon atoms [1]
- (ii) Any **two** from:  
 high melting point/boiling point  
 hard  
 colourless crystals/shiny  
 poor/non-conductor of electricity/insulator  
 insoluble in water [2]

[Total: 8]

09. 0620\_s13\_ms\_31 Q: 8

- (a) (i) regular arrangement / repeating pattern **NOT** structure [1]  
**cond:** ions [1]  
**not** molecules / atoms
- (ii) attraction between opposite charges / electrostatic attraction [1]
- (b) delocalised / mobile / free / sea of electrons [1]  
 positive ions / cations  
**not** atoms / protons / nuclei [1]  
 attraction between these electrons and ions [1]
- (c) **giant covalent**  
 no ions [1]  
 no delocalised / free / mobile / sea of electrons **or** all electrons [1]
- ionic**  
 in ionic solid ions cannot move [1]  
 liquid ionic compound ions can move [1]
- metallic**  
 (both solid and liquid) metals have delocalised (**or** alternative term) electrons [1]

[Total: 11]

10. 0620\_s13\_ms\_33 Q: 1

- (a) (i) *element*  
cannot be broken into anything simpler [1]  
by chemical means [1]  
**OR** made up of one type of atom only [2]
- (ii) *compound*  
two **or** more different elements [1]  
chemically bonded together [1]
- (iii) *mixture*  
two **or** more substances not chemically joined together [1]
- (b) (i) mixture [1]  
(ii) compound [1]  
(iii) element [1]
- (c) conductivity (of heat or electricity) [1]

[Total: 9]

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11. 0620\_w13\_ms\_32 Q: 1

- (a) C and F [1]
- (b) A [1]
- (c) B [1]
- (d) D [1]
- (e) E [1]
- (f) A and D [1]

[Total: 6]

12. 0620\_w13\_ms\_33 Q: 2

- (a) (i) positive **and** negative ions [1]  
 regular pattern / opposite charges closer than the same charge [1]
- (ii) so that charges cancel / ions may not have the same charge [1]
- (iii) Any **three** of:  
 high melting point or boiling point  
 hard  
 brittle  
 soluble in water / insoluble in organic solvents  
 conduct (electricity) in liquid state **or** in aqueous solution / non-conductors or  
 poor conductor (when solid) [3]
- (b) correct formula [1]  
 correct charges [1]  
 6x and 2o around oxygen [1]

**[Total: 9]**

13. 0620\_s12\_ms\_32 Q: 2

- (a) weak forces between layers or between (hexagonal) rings / weak bonds between layers or  
 between (hexagonal) rings / Van der Waals forces between layers or between (hexagonal)  
 rings; [1]  
 (layers/rings) slip/slide (over each other) / move over each other [1]
- (b) strong bonds (between atoms) / covalent bonds (between atoms); [1]  
all bonds are covalent/strong / each atom covalently bonded / carbon (atoms) is bonded to  
 four others / bonds are directional / (atoms are arranged) tetrahedrally; [1]  
**accept:** carbon has four bonds
- (c) graphite has delocalised / mobile / free electrons; [1]  
 diamond (outer shell) electrons used / fixed / localised in bonding / no delocalised electrons /  
 no mobile electrons / no free electrons; [1]