Answers Atomic Theory

MCQ	Answer	Area of Chemistry/ Comment
1.	B	
2.	C	
3.	A	
4.	D	
5.	C	
6.	B	
7.	B	
8.	D	
9.	A	
10.	D	
11.	D	
12.	A	
13.	D	
14.	B	
15.	A	
16.	A	

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Question			Acceptable Answer(s)	Max Mark	½ mark	Unacceptable
2	a		(Repulsion by) positive nucleus / (Repulsion by) positive core / Positive charged core (deflected them) / Positive charge nucleus (deflected them)/ Hit positive (protons in the) nucleus of gold atoms Repulsed by positive particles present in gold. Looking for Positive + nucleus/core/protons	1		Ions Positive gold atoms Gold is positive Positive metal Attraction of negative electrons – <u>not</u> cancelling Resistance between positively charged particles
2	b	i	Protons – 79 Electrons – 79 Neutrons – 118 All for 1 mark	1		
2	b	iii	Same atomic number different mass number / Same number of protons different number of neutrons / Same atomic number different number of neutrons/ same element different mass (number) accept abbreviations for protons and neutrons Ignore mention of electrons	1		Different number of neutrons in the nucleus/ Same atomic number/ Different mass numbers/ Same atom different mass number

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Element	Li	Na	K	Rb	Cs	Fr
Atomic number	3	11	19	37	55	87
Melting point (^{o}C)	181	98	63	39	28	

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<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Max Mark</th><th>Additional Guidance</th></tr>
<tr><td>1.</td><td>(a)</td><td>(i)</td><td>
<table>
<tr><td colspan="3">In the Nucleus</td></tr>
<tr><td>Particle</td><td>Relative Mass</td><td>Charge</td></tr>
<tr><td>Proton</td><td>1</td><td></td></tr>
<tr><td>Neutron</td><td></td><td>0
neutral
no charge</td></tr>
</table>
BOTH REQUIRED
</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>
<table>
<tr><td colspan="3">Outside the Nucleus</td></tr>
<tr><td>Particle</td><td>Relative Mass</td><td>Charge</td></tr>
<tr><td>ELECTRON</td><td></td><td>–
–1
negative</td></tr>
</table>
BOTH REQUIRED
</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>14·5</td><td>1</td><td>Accept 14·5 g or 14·5 amu.</td></tr>
</table>

b) They each have a single outer electron.

[Problem Solving – Groups in Periodic Table]

c) Alkali metals

20.

a)

(i) 2,8,1 – Sodium (Na)

(ii) 2,8,8 – Argon (Ar)

(iii) 2,4 – Carbon (C)

(iv) 2,8,7 – Chlorine (Cl)

21.

B (W and Y)

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2	a		Atoms with same atomic number/number of protons/positive particles and different mass number/number of neutrons	1	
2	b		Protons = 35 Neutrons = 44	1	Both required
2	c		(79 × 55) + (81 × 45) / 100 = 79·9 79·9 on its own 80 with working	2	correct substitution of mass and percentage = 1 mark 80 on its own = 0 marks

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Question			Answer	Max Mark	Additional Guidance
11.	(a)		2,8,6 **or** a correct target diagram etc.	1	Punctuation between numbers is not required. Zero marks awarded for values in the wrong order eg 6.8.2
	(c)		Decreases **or** As you go from lithium to potassium (alkali metals) it (ionisation energy) decreases. **or** As you go from fluorine to bromine (halogens) it (ionisation energy) decreases. **or** as the atomic number in the group increases it decreases	1	Accept alternatives to decreases e.g. goes down, gets less, gets lower If answer states trend is for going across a period **or** specific elements not in a group award zero marks. Zero marks awarded for as you go from potassium to lithium it decreases. Zero marks awarded for relating ionisation energy to reactivity. If candidate answers the question in terms of going up a group this is acceptable as long as they state both the direction (going up a group) and the trend (increases).