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CHEMISTRY

MULTIPLE CHOICE - 5

CHEMICAL BONDING

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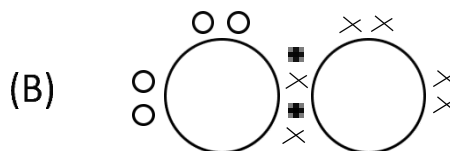
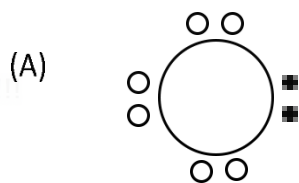
Chemical Bonding - 5

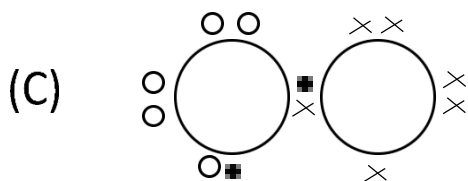
1. Which bonding type does not correspond to description of physical properties?

	Bonding type	Physical properties
A	Giant covalent	High melting point, conducts electricity when in solution but not when solid
B	Simple covalent	Low melting point, does not conduct electricity in any state
C	Metallic	Verity of melting point, conducts electricity when solid and when molten
D	Ionic	High melting point, conducts electricity when in molten but not when solid

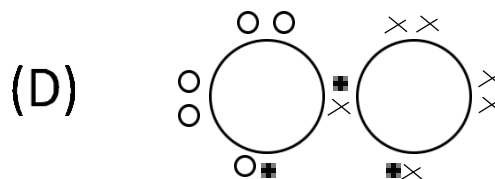
2. When barium metal burns in oxygen, the ionic compound barium peroxide, BaO_2 , is formed.

Which dot-and cross diagram could represent the structure of the anion in BaO_2





key ○ electron from first oxygen atom



● electron from barium atom

3. Which of the following statements about the properties associated with ionic and covalent bonds is correct?

- (A) The only covalent compounds with high melting points are those in which hydrogen bonds occur.
- (B) Any covalent compound that contains both oxygen and hydrogen in its molecule forms hydrogen bonds.
- (C) ionic bonds and covalent bonds cannot both occur in the same compound.
- (D) Ionic compounds differ from metals in that ionic compounds do not conduct electricity in the solid state.

4. Use of the Data Booklet is relevant to this question.

Which particle contains a single unpaired electron?

- (A) a molecule of H_2S
- (B) one of the particles formed after the heterolytic fission of a chlorine molecule
- (C) the ammonium ion in NH_4Cl
- (D) the copper ion in CuO

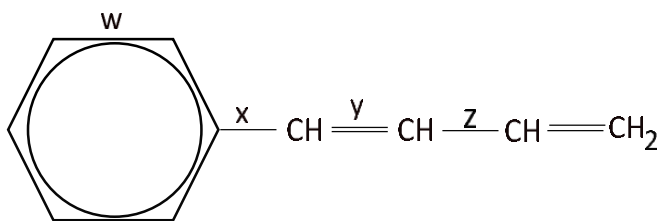
5. Consider the following four compounds:

- (1) $(\text{CH}_3)_3\text{CH}$
- (2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{SH}$
- (4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

What is the order of increasing boiling point of the compounds (lowest first)?

- (A) 1 4 3 2
- (B) 2 3 4 1
- (C) 3 2 4 1
- (D) 4 1 2 3

6. Four carbon - carbon bonds are labelled in the diagram.



Which bonds are made up of an sp^2 - sp^2 overlap?

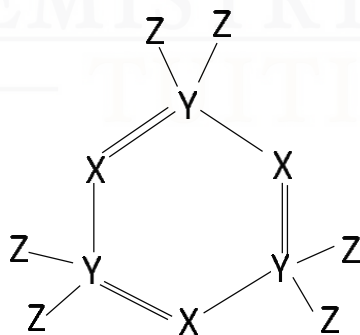
- (A) w and y only (B) w, x and y only (C) w, x y and z (D) x, y and z only

7. Which of the following statements best explains why the boiling point of butanone (79.6°C) is higher than that of pentane (36.1°C)?

[A_r : H, 1.0; C, 12; O, 16]

- (A) The butanone molecule has a larger surface area than the pentane molecule.
 (B) The covalent bonds in the butanone molecule are stronger than those in the pentane molecule.
 (C) There are hydrogen bonds between butanone molecules, but not between pentane molecules.]
 (D) There are dipole-dipole forces between butanone molecules, but only van der Waals' forces between pentane molecules.

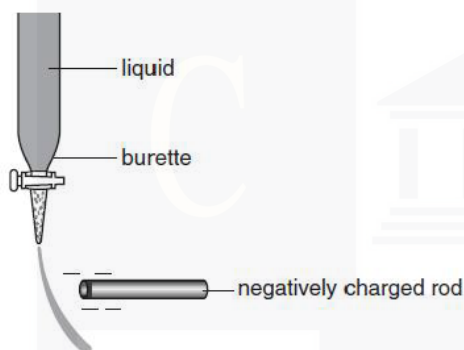
8. A stable molecule containing atoms of the elements X, Y and Z has the following structure.



Which element could X, Y and Z be

	X	Y	Z
A	N	P	Cl
B	O	S	Cl
C	B	C	H
D	P	Si	H

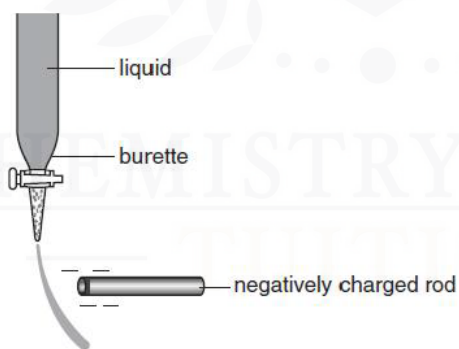
9. The diagram shows a liquid following from a burette and charged and a charged rod being brought near the flow.



Which liquid would be deflected as shown?

- (A) bromine (B) cyclohexane (C) hexachloroethane (D) trichloromethane
- (B)

10. A slow stream of water from a tap can be deflected by an electrostatically charged plastic rod because water is a polar molecule.



Why is a water molecule polar?

- (A) Molecules are bonded together by hydrogen bonds.
- (B) The oxygen and hydrogen atoms have different electronegativities.
- (C) The oxygen atom has two lone pairs of electrons.
- (D) Water is able to dissociate into ions.



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