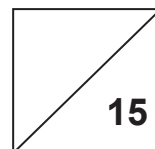




Name:

Class: 12S.....

Time: 20 min



Circle true/false for each statement. For each **false** statement, **briefly** comment what is wrong.

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- 1 $2 \text{NaOH (aq)} + \text{Cl}_2 \text{(aq)} \rightarrow \text{NaCl (aq)} + \text{NaClO (aq)}$ True / False
The above is an example of a disproportionation reaction.
.....
- 2 The electronic configuration of Cr in chromium peroxide $\text{Cr}_2(\text{O}_2)_2$ is $[\text{Ar}] 3d^4$. True / False
.....
- 3 The Be_3Cl_6 trimer is a simple covalent molecule containing four co-ordinate bonds. True / False
.....
- 4 The geometry and shape of SbF_5^{2-} is octahedral and square pyramidal respectively. True / False
.....
- 5 The ΔH_c of but-1-ene and ethene are **p** and **q** kJ mol^{-1} respectively. True / False
Thus, the ΔH_r of $2\text{C}_2\text{H}_4(\text{g}) \rightarrow \text{C}_4\text{H}_8(\text{g})$ is **2q – p** kJ mol^{-1} .
.....
- 6 The following shows step II of a reaction which consists of three steps: True / False
II $\text{N}_2\text{O}_2 + \text{H}_2 \longrightarrow \text{H}_2\text{O} + \text{N}_2\text{O}$ (slow)
The reaction is first order with respect to both N_2O_2 and H_2 .
.....
- 7 For an overall zero order reaction, the sketch of rate vs time yields a straight line as changing the concentration of the reactants does not affect the rate. True / False
.....
- 8 MgCl_2 deviates from ideality as it forms strong ionic bonds. True / False
.....

- 9 When temperature changes, the position of the equilibrium always shifts either to the left or right depending on the ΔG . True / False

.....

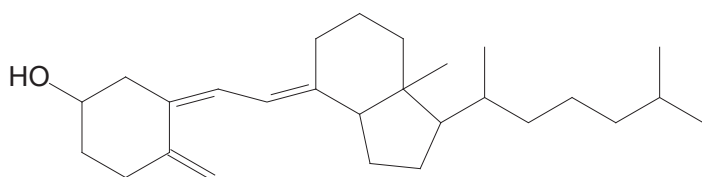
- 10 When 15 cm³ of a gaseous hydrocarbon **X** were burned in 100 cm³ of oxygen, the final gaseous mixture contained 60 cm³ of carbon dioxide and 10 cm³ of unreacted oxygen. The formula of hydrocarbon **X** is C₄H₈. True / False

.....

- 11 The lattice energy of silicon dioxide is:
 $\text{Si}^{4+}(\text{aq}) + 2\text{O}^{2-}(\text{aq}) \longrightarrow \text{SiO}_2(\text{s})$ True / False

.....

- 12 True / False



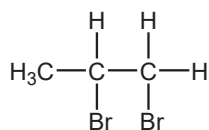
The addition of HBr (*l*) to the above molecule will result in it having less than 6 stereogenic centres.

.....

- 13 Acidified KMnO₄ is used as an oxidizing agent for alkenes. HCl (aq) can be used to acidify KMnO₄. True / False

.....

- 14 When propene reacts with a mixture of Br₂ in conc NaCl, the following molecule might be produced: True / False



.....

- 15 The homolytic fission of CHFC/CF₂Cl by UV radiation would likely result in the formation of •CFC/CF₂Cl. True / False

.....

~~~~~ End of Quiz ~~~~~

Post Quiz Reflection:

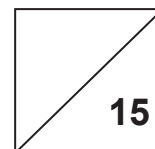
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Name: .....

Class: 12S.....

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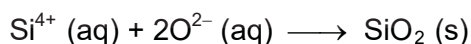
- 1      $2 \text{NaOH (aq)} + \text{Cl}_2 \text{(aq)} \rightarrow \text{NaCl (aq)} + \text{NaClO (aq)}$  True / False  
The above is an example of a disproportionation reaction.  
  
***Cl is reduced (O to -1 in NaCl) and oxidised (O to +1 in NaClO) at the same time.***
- 2     The electronic configuration of Cr in chromium peroxide  $\text{Cr}_2(\text{O}_2)_2$  is  $[\text{Ar}] 3d^4$ . True / False  
  
***CrO<sub>2</sub>. Cr has oxidation state of +2.***
- 3     The  $\text{Be}_3\text{Cl}_6$  trimer is a simple covalent molecule containing four co-ordinate bonds. True / False  
  
***It consists of 3 BeCl<sub>2</sub> monomers.***
- 4     The geometry and shape of  $\text{SbF}_5^{2-}$  is octahedral and square pyramidal respectively. True / False  
  
***It forms a 6 co-ordinate geometry.***
- 5     The  $\Delta H_c$  of but-1-ene and ethene are **p** and **q**  $\text{kJ mol}^{-1}$  respectively. True / False  
Thus, the  $\Delta H_r$  of  $2 \text{C}_2\text{H}_4(\text{g}) \rightarrow \text{C}_4\text{H}_8(\text{g})$  is  $2q - p \text{ kJ mol}^{-1}$ .  
.....
- 6     The following shows step II of a reaction which consists of three steps: True / False  
**II**      $\text{N}_2\text{O}_2 + \text{H}_2 \longrightarrow \text{H}_2\text{O} + \text{N}_2\text{O} \quad (\text{slow})$   
The reaction is first order with respect to both  $\text{N}_2\text{O}_2$  and  $\text{H}_2$ .  
***H<sub>2</sub> might be an intermediate which can't appear in the rate equation.***
- 7     For an overall zero order reaction, the sketch of rate vs time yields a straight line as changing the concentration of the reactants does not affect the rate. True / False
- 8      $\text{MgCl}_2$  deviates from ideality as it forms strong ionic bonds. True / False  
  
***MgCl<sub>2</sub> is a solid. No relation to ideal gas.***

- 9 When temperature changes, the position of the equilibrium always shifts either to the left or right depending on the  $\Delta G$ . True / **False**

***It depends on  $\Delta H$ . If  $\Delta H$  is zero, position of equilibrium is not affected by temperature changes.***

- 10 When 15 cm<sup>3</sup> of a gaseous hydrocarbon **X** were burned in 100 cm<sup>3</sup> of oxygen, the final gaseous mixture contained 60 cm<sup>3</sup> of carbon dioxide and 10 cm<sup>3</sup> of unreacted oxygen. The formula of hydrocarbon **X** is C<sub>4</sub>H<sub>8</sub>. True / False

- 11 The lattice energy of silicon dioxide is:



***SiO<sub>2</sub> is a giant covalent molecule, lattice energy not applicable.***

- 12  True / False

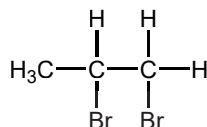
The addition of HBr (l) to the above molecule will result in it having less than 6 stereogenic centres.

***HBr (l) does not react with the carbon double bonds as it is not in gaseous state.***

- 13 Acidified KMnO<sub>4</sub> is used as an oxidizing agent for alkenes. HCl (aq) can be used to acidify KMnO<sub>4</sub>. True / **False**

***Use sulfuric acid as hydrochloric acid can be oxidized to Cl<sub>2</sub> by KMnO<sub>4</sub>.***

- 14 When propene reacts with a mixture of Br<sub>2</sub> in conc NaCl, the following molecule might be produced: True / **False**



***Intermediate is a bromonium cyclic intermediate. Molecule is formed when Br<sup>-</sup> attacks the intermediate.***

- 15 The homolytic fission of CHFC/CF<sub>2</sub>Cl by UV radiation would likely result in the formation of •CFC/CF<sub>2</sub>Cl. True / **False**

***•CHF CF<sub>2</sub> Cl should be produced instead as bond energy of C-Cl is the lowest.***

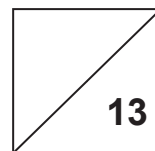
~~~~~ End of Quiz ~~~~~




Name:

Class: 12S.....

Time: 18 min



Circle true/false for each statement. For each **false** statement, **briefly** comment what is wrong.

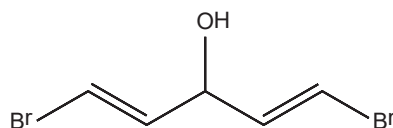
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- 1 When mixed with dichloromethane CH_2Cl_2 , 188g of AgBr contains the same no. of particles as 103 g of NaBr. True / False
.....
- 2 The first seven ionization energies of an element are as follows (in kJ mol^{-1}):
790, 1600, 3200, 4400, 16100, 19800, 23800
The outer electronic configuration of the element could be $\text{nd}^2 \text{ns}^2$. True / False
.....
- 3 All s subshells are spherical, p subshells are dumb-bell shaped regardless of their orientation in space. True / False
.....
- 4 Ammonium chloride is soluble in water as it can form inter-molecular hydrogen bonding with water molecules. True / False
.....
- 5 P^{3-} is more easily polarised than Cl^- by a cation. True / False
.....
- 6 The enthalpy change of neutralization and electron affinity always have an exothermic enthalpy change. True / False
.....
- 7 The magnitude of lattice energy for AlF_3 is larger than that of AlBr_3 as F^- is smaller than Br^- . True / False
.....
- 8 XeF_2C_2 could be polar or non-polar depending on its structure. True / False
.....

9 Enantiomers have the same enthalpy change of formation. True / False

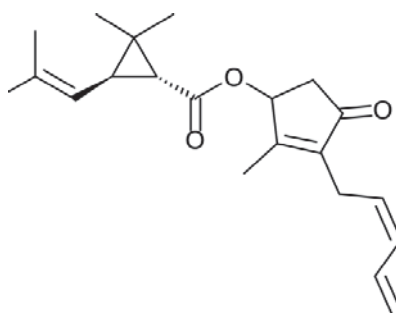
.....

10 This molecule can exhibit both optical and cis-trans isomerism: True / False



.....

11 The total number of *cis-trans* isomers that are possible for this organic molecule is 4. True / False

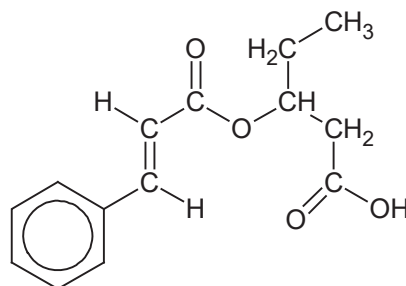


.....

12 The hybridisation states of N in NO_3^- and NO_2^+ is sp^2 and sp respectively. True / False

.....

13 The functional groups present are ketone, carboxylic acid and alkene. True / False



.....

~~~~~ End of Quiz ~~~~~

Post Quiz Reflection:

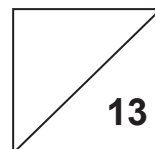
- ☐ This is my best, I have reached my limit!
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Name: .....

Class: 12S.....

Time: 18 min



**Circle** true/false for each statement. For each **false** statement, **briefly** comment what is wrong.

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- 1 When mixed with dichloromethane  $\text{CH}_2\text{Cl}_2$ , 188g of AgBr contains the same no. of particles as 103 g of NaBr. True / **False**

**AgBr forms a ppt. NaBr forms ion dipole interaction with DCM and hence will dissociate into  $\text{Na}^+$  and  $\text{Br}^-$ . 188 g of AgBr will yield one mole of particles while 103 g of NaBr will yield two mole of particles.**

- 2 The first seven ionization energies of an element are as follows (in  $\text{kJ mol}^{-1}$ ):  
790, 1600, 3200, 4400, 16100, 19800, 23800  
The outer electronic configuration of the element could be  $\text{nd}^2\text{ns}^2$ . True / **False**

**It is a Group IV element, 4 valence electrons, hence  $\text{ns}^2\text{np}^2$**

- 3 All s subshells are spherical, p subshells are dumb-bell shaped regardless of their orientation in space. True / **False**

**$P_x$ ,  $P_y$  and  $P_z$  orbitals have the same shape although their spatial orientation is different.**

- 4 Ammonium chloride is soluble in water as it can form inter-molecular hydrogen bonding with water molecules. True / **False**

**$\text{NH}_4\text{Cl}$  forms ion-dipole interactions with water. Can't form hydrogen bonding as N has no lone pair.**

- 5  $\text{P}^{3-}$  is more easily polarised than  $\text{Cl}^-$  by a cation. True / **False**

**$\text{P}^{3-}$  is bigger than  $\text{Cl}^-$ . Hence it is more polarisable.**

- 6 The enthalpy change of neutralization and electron affinity always have an exothermic enthalpy change. True / **False**

**Only first electron affinity is exothermic.**

- 7 The magnitude of lattice energy for  $\text{AlF}_3$  is larger than that of  $\text{AlBr}_3$  as  $\text{F}^-$  is smaller than  $\text{Br}^-$ . True / **False**

**$\text{AlBr}_3$  is a simple covalent molecule.**



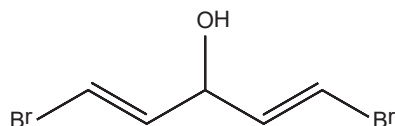
- 8  $\text{XeF}_2\text{Cl}_2$  could be polar or non-polar depending on its structure. True / False

*It has a square planar shape. If the F atoms are opposite to each other, the molecule is non-polar.*

- 9 Enantiomers have the same enthalpy change of formation. True / False

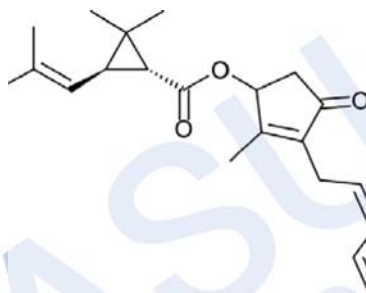
*They have similar structures and undergo similar chemical reactions.*

- 10 This molecule can exhibit **both** optical and cis-trans isomerism: True / False



*This molecule has a chiral centre but it does not exhibit optical activity as it is a meso compound (plane of symmetry at C bonded to OH group).*

- 11 The total number of cis-trans isomers that are possible for this organic molecule is 4. True / False

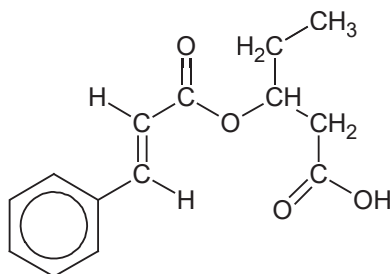


*No cis-trans isomerism for double bond in the ring and terminal  $-\text{CH}_2$ .*

- 12 The hybridisation states of N in  $\text{NO}_3^-$  and  $\text{NO}_2^+$  is  $\text{sp}^2$  and  $\text{sp}$  respectively. True / False

*$\text{NO}_3^-$  and  $\text{NO}_2^+$  have trigonal planar and linear geometry respectively.*

- 13 The functional groups present are ketone, carboxylic acid and alkene. True / False



*There isn't any ketone around. There is an ester functional group.*

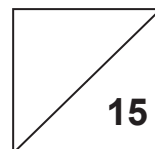
~~~~~ End of Quiz ~~~~~



Name:

Class: 12S.....

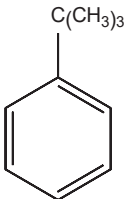
Time: 20 min



Circle true/false for each statement. For each **false** statement, **briefly** comment what is wrong.

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- 1 KMnO_4 is an oxidizing agent which can be reduced to Mn(IV) and Mn(II). True / False
Mn(IV) can act as oxidizing or reducing agent.
.....
- 2 Second ionization energy of Na is higher than Ne as Na gains an octet configuration. True / False
.....
- 3 Cyclohexene contain delocalized electrons True / False
.....
- 4 CO_2 is a non-polar molecule. However it can dissolve in water as it forms inter molecular hydrogen bonding with water molecules. True / False
.....
- 5 The enthalpy change of formation of gaseous metals is always endothermic. True / False
.....
- 6 For any reaction, the activation energy of the forward reaction equals to that of a backward reaction. True / False
.....
- 7 The half life formula $t_{1/2} = \ln 2/k$ can be applied to solve reactions with pseudo first order kinetics. True / False
.....
- 8 In the Al_2Cl_6 dimer, the Cl anions are tetrahedrally arranged around Al. True / False
.....

- 9 All simple covalent molecules cannot conduct electricity when dissolved in aqueous solutions. True / False
.....
- 10 In the kinetic theory of gases, the volume of the gas is negligible. True / False
.....
- 11 The ideal gas equation works best when pressure is low, and breaks down when pressure is high. True / False
.....
- 12 If $\Delta G < 0$, the reaction will definitely occur. True / False
.....
- 13  True / False
- Use this molecule to answer question 13 and 14.
This molecule is resistant to oxidation by KMnO_4 .
.....
- 14 The substituent on benzene ring makes the molecule more easily attacked by an incoming nucleophile as it is electron donating in nature. True / False
.....
- 15 The bond energy of F–F is higher than Br–Br. True / False
.....

~~~~~ End of Quiz ~~~~~

Post Quiz Reflection:

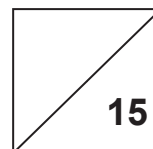
- ☐ This is my best, I have reached my limit!
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Name: .....

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- 1  $\text{KMnO}_4$  is an oxidizing agent which can be reduced to Mn(IV) and Mn(II). **True / False**  
Mn(IV) can act as oxidizing or reducing agent.

***Mn(IV) can be oxidized to Mn(VII) or reduced to Mn(II).***

- 2 Second ionization energy of Na is higher than Ne as Na gains an octet configuration. **True / False**

***IE depends on nuclear charge and shielding, not on octet configuration.***

- 3 Cyclohexene contain delocalized electrons **True / False**

***The electrons are localized on the bond.***

- 4  $\text{CO}_2$  is a non-polar molecule. However it can dissolve in water as it forms inter molecular hydrogen bonding with water molecules. **True / False**

.....

- 5 The enthalpy change of formation of gaseous metals is always endothermic. **True / False**

***It involves atomization of the solid metal to gaseous state which is endothermic.***

- 6 For any reaction, the activation energy of the forward reaction equals to that of a backward reaction. **True / False**

***Activation energies are only equal if  $\Delta H = 0 \text{ J/mol}$ .***

- 7 The half life formula  $t_{1/2} = \ln 2/k$  can be applied to solve reactions with pseudo first order kinetics. **True / False**

.....

- 8 In the  $\text{Al}_2\text{Cl}_6$  dimer, the Cl anions are tetrahedrally arranged around Al. **True / False**

***It should be chlorine atoms, not anions.***

- 9 All simple covalent molecules cannot conduct electricity when dissolved in aqueous solutions. True / **False**

***HCl being a simple molecule can conduct electricity in aq solutions.***

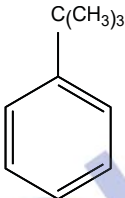
- 10 In the kinetic theory of gases, the volume of the gas is negligible. True / **False**

***It should be volume of gas particles are negligible compared to volume of container.***

- 11 The ideal gas equation works best when pressure is low, and breaks down when pressure is high. **True** / False

- 12 If  $\Delta G < 0$ , the reaction will definitely occur. True / **False**

***If activation energy is too high, reaction will not occur even if it is feasible.***

- 13  True / False

Use this molecule to answer question 13 and 14.  
This molecule is resistant to oxidation by  $\text{KMnO}_4$ .

- 14 The substituent on benzene ring makes the molecule more easily attacked by an incoming nucleophile as it is electron donating in nature. True / **False**

***It should be attached by electrophile, not nucleophile.***

- 15 The bond energy of F-F is higher than Br-Br. True / **False**

***Bond energy of fluorine is lower as there is severe lone pair lone pair on the 2 F atoms resulting in the lengthening of the bond.***

~~~~~ End of Quiz ~~~~~

Post Quiz Reflection:

- ☐ This is my best, I have reached my limit!
☐ I can do much better than this! I have yet to unleash my potential!