



CHEMISTRY

BOOKS - SURA CHEMISTRY (TAMIL ENGLISH)

PUBLIC EXAMINATION - MARCH 2019

Part I Answer All The Questions

1. Many of the organic compounds are inflammable because of its :

- A. Vander Waal's force
- B. Co-ordinate nature
- C. Covalent nature
- D. Ionic nature

Answer: A:C



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2. When Δn_g is negative in chemical equilibrium reaction then :

A. $K_p < K_c$

B. $K_p = 1/K_c$

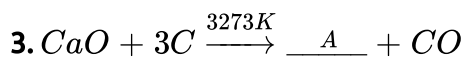
C. $K_p = K_c(RT)^{-ve}$

D. $K_p > K_c$

Answer: C



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D. Ca_2O

Answer: A::B::C



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4. Splitting of spectral lines in an electric field is called:

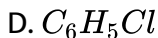
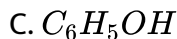
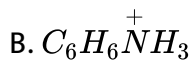
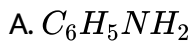
- A. Compton effect
- B. Stark effect
- C. Zeeman effect
- D. Shielding effect

Answer: C::D



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5. Which of the following species does not exert a resonance effect ?



Answer: C

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6. Match the following

Compound		Uses
(1) Chloro picrin	(i)	Detection of primary
(2) Methyl Isocyanide	(ii)	DDT
(3) Chloro benzene	(iii)	Paint remover
(4) Methylene chloride	(iv)	Soil sterilizer

A. (1) - (iv), (2) - (iii), (3) - (ii), (4) - (i)

B. (1) - (iii), (2) - (iv), (3) - (ii), (4) - (iii)

C. (1) - (i), (2) - (ii), (3) - (iv), (4) - (iii)

D. (1) - (iv), (2) - (2) - (1), (3) - (ii), (4) - (iii)

Answer: A::B::C::D



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7. Use of hot air ballon in meteorological observatory is an application of :

- A. Kelvin's Law
- B. Brown's Law b
- C. Boyle's Law
- D. Newton's Law

Answer: A::B



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8. What is pH of rain water ?

- A. 5. 6

B. 4. 6

C. 6. 5

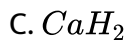
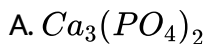
D. 7. 5

Answer:



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9. The name 'Blue John' is given to which of the following compounds ?



Answer: A::B::C



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10. The element with positive electron gain enthalpy is

- A. Argon
- B. Fluorine
- C. Hydrogen
- D. Sodium

Answer: A



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11. Which of the following molecule does not contain π bond ?

- A. CO_2
- B. H_2O
- C. SO_2
- D. NO_2

Answer: B

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12. Which of the following compound(s) has /have percentage of carbon same as that in ethylene (C_2H_4) .

A. benzene

B. ethane

C. propene

D. ethylen

Answer:

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13. The SI unit of Molar heat capacity is :

A. $JK^{-1}mol^{-1}$

B. $kJmol^+$

C. $kJmol^{-1}$

D. cm

Answer: A



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14. What percentage of solution of H_2O_2 is called as "100 - Volume "

H_2O_2

A. 0.15

B. 0.5

C. 0.2

D. 0.3

Answer: C

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15. Osmotic pressure (π)

A. $\pi RT = n$

B. $V = \pi nRT$

C. $\pi = nRT$

D. $\pi V = nRT$

Answer:

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16. Which one of the following represents 180g of water ?

A. 5 Moles of water

B. 6.022×10^{24} molecules of water

C. $180 \times 6.022 \times 10^{23}$ molecules of water

D. 90 moles of water

Answer: A::B::C::D

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17. Which of the following compound(s) has/have percentage of carbon same as that in ethylene (C_2H_4)?

A. Propene

B. Ethyne

C. Benzene

D. Ethane

Answer:

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18. Match the following

(A, $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$, 1, Heisenberg's uncertainty principle), (B, $n = 1, l = 0, m = 0, s = +1/2$, 3, Aufbau principle), (C, $n = 1, l = 1, m = 0, s = +1/2$, 3, Aufbau principle), (D, $\Delta x \cdot \Delta p \geq \frac{h}{4\pi}$, 1, Heisenberg's uncertainty principle)

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	3	4	1

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	1	4	3

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	1	2	4

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	2	1	4

Answer: A::B::C::D



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19. How many electrons is an atom with atomic number 30 can have ($n + l = 4$) ?

A. 5

B. 6

C. 7

D. 8

Answer:



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20. A certain third period element has the following successive values of ionization energies in $\text{K} . \text{J} . \text{mol}^{-1}$

IE_1	IE_2	IE_3	IE_4	IE_5
786	580	3230	4360	16100

the element is

A. Carbon

B. Nitrogen

C. Aluminium

D. Silicon

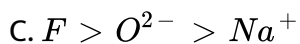
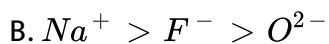
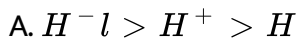
Answer: A





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21. Which of the following orders of ionic radii is correct ?



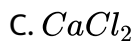
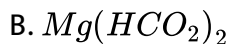
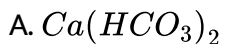
D. None of these

Answer:



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22. The cause of permanent hardness of water is due to



D. $MgCO_3$

Answer: A::B::C



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23. Water is a

A. Basic oxide

B. Acidic oxide

C. Amphoteric oxide

D. None of these

Answer: A::C::D



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24. The suspension of slaked lime in water is known as

- A. Lime water
- B. Quick lime
- C. Milk of lime
- D. Aqueous solution of slaked lime

Answer:

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25. The alkali metal used in devising photo electric cell is

- A. Cesium
- B. Lithium
- C. Sodium
- D. Magnesium

Answer: C

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26. If temperature and volume of an ideal gas is increased to twice its values, the initial pressure P becomes

A. $4P$

B. $2P$

C. P

D. $3P$

Answer:



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27. Equal moles of hydrogen and oxygen gas are placed in a container, with a pin-hole through which both can escape what fraction of oxygen escapes in the time required for one-half of the hydrogen to escape.

A. $3/8$

B. $1/2$

C. $1/8$

D. $/4$

Answer: A



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28. An ideal gas expands from the volume of $1 \times 10^{-3} m^3$ to $1 \times 10^{-2} m^3$ at $300K$ against a constant pressure at $1 \times 10^5 Nm^{-2}$. The work done is

A. $-900J$

B. $900 K J$

C. $270 K J$

D. $-900KJ$

Answer:



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29. Which of the following is not a thermodynamic function?

- A. Internal energy
- B. Enthalpy
- C. Entropy
- D. Frictional energy

Answer: A::C



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30. Assertion : Alkali metals act as good reducing agents

Reason : Alkali metals have higher ionization energies.

- A. Assertion is true but Reason is false
- B. Both Assertion and Reason are true

C. Assertion is false but Reason is true

D. Both Assertion and Reason are false

Answer: A::B

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Part II Answer Any Six Of The Following Questions Question No 24 Is Compulsory

1. State and explain Pauli's Exclusion Principle.

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2. Define- Valency.

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3. What are ideal gases ?

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4. State the third law of thermodynamics.

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5. What is called Bond Length ? Name the techniques through which the length of a bond can be determined.

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6. Describe the reactions involved in the detection of nitrogen in an organic compound by Lassaigne method.

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7. How is Alkane prepared from Grignard reagent ?

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8. Define - Acid rain .

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9. Which is the suitable method for detection of Nitrogen present in food and fertilizers ?

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Part Iii Answer Any Six Of The Following Questions Question No 33 Is Compulsory

1. Calculate the equivalent mass of H_2SO_4 .

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2. Explain the diagonal relationship

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3. How is Tritium prepared ?

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4. Define -Le-Chatelier principle.

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5. What are isotonic solutions?

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6. Both C_2H_2 and CO_2 have the same structure. Explain why.

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7. Write a note on williamson synthesis.

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8. Explain why $Ca(OH)_2$ is used in white washing.

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9. Give the structural formula for the following compounds .

(a) m- dinitrobenzene

(b) P-dichlorobenzene

(c) 1, 3, 5, Tri-methyl Benzene

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1. Calculate oxidation number of oxygen in H_2O_2 .

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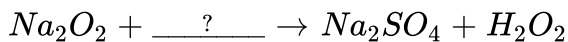
2. Derive de-Broglie equation.

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3. State and explain Dobereiner's "Triad" .

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4. Complete the following equation



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5. Among the alkaline earth metals BeO is insoluble in water but oxides are soluble. Why ?

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6. state Diffusion Law .

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7. Calculate the entropy change during the melting of one mole of ice into water at $0^{\circ}C$ and 1 atm pressure. Enthalpy of fusion of ice is $6008J mol^{-1}$.

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8. Write the Balance chemical equation for the

$$K_c = \frac{[CaO_s][CO_2(g)]}{[CaCO_s]}$$



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9. NH_3 and HCl do not obey Henry's law. Why ?



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10. Write the structure of the following compounds.



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11. Write the structure of the following compounds.



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12. Identify the cis and trans isomers for the following . compounds.

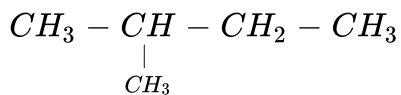


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13. Explain with example the Positive Mesomeric Effect .

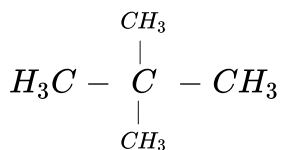
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14. Write the IUPAC name for the following compound



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15. Write the IUPAC name for the following compound



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16. What are electrophiles and nucleophiles ? Give suitable examples for each.

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17. How will you get the following product with the given reactants ?

Acetylene \rightarrow Benzene

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18. How will you get the following product with the given reactants ?

Phenol \rightarrow Benzene

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19. How will you get the following product with the given reactants ?

Benzene → Toluene

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20. Write any two different components you get during fractional distillation of Coal Tar at any two different temperature.

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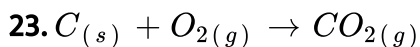
21. A Compound having the empirical formula C_6H_6O has the vapour density 47 . Find its Molecular formula.

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22. The Simple Aromatic Hydrocarbon compound (A) reacts with Bromine to give (B) . Compound (A) reacts with Raney Ni and gives (C) . Identify (A),

(B) and (C) .

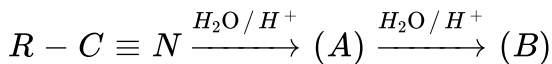
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Calculate the standard entropy change for the above reaction, given the standard entropies of $CO_{2(g)}$, $C_{(s)}$, $O_{2(g)}$ are 213.6, 5.740 and 205 JK^{-1} respectively.

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24. Identify the compound (A) and (B)



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Part II Answer Any Six Question And Question No 24 Is Compulsory

1. Define equivalent mass.

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2. Give the electronic configuration of Mn^{2+} and Cr^{3+} ions .

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3. Compare the first ionization energies of Carbon and Boron and give reason.

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4. Mention the uses of heavy water .

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5. Why sodium hydroxide is much more water soluble than chloride?

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6. state Dalton's law of partial pressure.

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7. What is the density of N_2 gas at $22^\circ C$ and 5.00 atm pressure ? ($R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$)

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8. State the third law of thermodynamics.

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9. Calculate the no. of moles of Ethane required to produce 44 g of $CO_{2(g)}$ after combustion .

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Part Iii Answer Any Six Questions And Question No 33 Is Compulsory

1. $X_2 + 3Y_2 \rightarrow 2XY_3$ In this reaction 2 moles of X_2 and 4.5 moles of Y_2 react to give products. Which is the limiting agent and calculate the no. of moles X_2 , Y_2 and XY_3 in the reaction mixture?

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2. Explain briefly the time independent Schrodinger wave equation. S

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3. What are isoelectronic ions ? Give examples.

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4. Write short notes on Ortho and Para hydrogen.

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5. How is plaster of paris prepared ?

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6. Why do alkali metals give different colours when heated in bunsen flame ?

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7. Derive the relationship between C_p and C_v for an ideal gas.

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8. Define Hess's law of constant heat summation.

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9. A gas contained in a cylinder fitted with a frictionless piston expands against a constant external pressure of 1 atm from a volume of 5 litres to a volume of 10 litres. In doing so it absorbs 400 J of thermal energy from its surroundings. Determine the change in internal energy of system.

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1. Calculate the oxidation states of oxygen in H_2O_2 and KO_2 .

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2. Derive de-Broglie equation.

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3. Calculate the total number of radial nodes and angular nodes present in 4d and 5f orbitals.

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4. Write the descending order of electrons releasing tendencies of the Zn, Cu and Ag metals. Arrange the metals Zn, Cu and Ag in the descending order of their effective nuclear charge,

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5. Define modern periodic law.

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6. Define effective nuclear charge. Arrange s,p, d and f orbitals in the descending order of their effective nuclear charge .

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7. Explain the diagonal relationship

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8. NH_3 has exceptionally high melting point and boiling point as compared to those of the hydrides of the remaining element of group 15. Explain.

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9. Explain the exchange reactions of deuterium

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10. Write notes on Interstitial Hydrides.

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11. Write briefly the biological importance of Calcium.

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12. Define Graham's law of diffusion.

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13. It takes 192 sec for an unknown gas to diffuse through a porous wall and 84 sec for N_2 gas to effuse at the same temperature and pressure.

What is the molar mass of the unknown gas?

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14. Define compressibility factor Z .

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15. State Zeroth law of thermodynamic.

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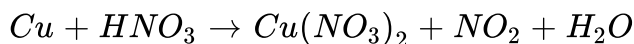
16. State Kelvin- Planck statement of second law of thermodynamics.

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17. Calculate the empirical and molecular formula of the compound containing 80% Carbon, 20% Hydrogen. If the molecular mass of the compound is 30 then determine the molecular formula.

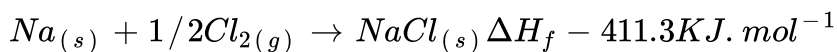
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18. Balance the following equation by oxidation number method



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19. Calculate the lattice energy of formation of NaCl from the following data :



$$\text{Heat of sublimation of } Na_{(s)} = 108.7 kJ \cdot mol^{-1}$$

$$\text{Ionisation energy of } Na_{(g)} = 495.0 kJ \cdot mol^{-1}$$

$$\text{Dissociation energy of } Cl_{2(g)} = 244 kJ \cdot mol^{-1}$$

$$\text{Electron affinity of } Cl_{(g)} = -349.0 kJ \cdot mol^{-1}$$





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