

JEE Main 29 January 2024 Shift 1 Answer Key

Chemistry

Q.1: Which of the following pairs will be formed by the decomposition of KMnO_4 ?

- i. MnO_4^- , MnO_2
 - ii. K_2MnO_4 , MnO_2
 - iii. KMnO_4 , MnO_2
 - iv. MnO_2 , H_2O
- A.1: K_2MnO_4 , MnO_2

Q.2: Calculate the Molarity of a solution having a density of 1.5 g/ml, percentage of (w/w) of solute as 36%, and molecular weight of solute 36 g/mol.

A.2: 15

Q.3: What is the energy difference between the actual structure and its most stable resonating structure having the least energy is called as?

- Electromeric Effect
- Resonance Energy
- Inductive Effect
- Hyperconjugation

A.3: Resonance Energy

Q.4: If alkaline KMnO_4 is oxidised iodide to give a particular product (A), then determine the oxidation state of iodine in the compound (A).

A.4: +5

Q.5: What is the effect that occurs between lone pair and pi bond?

A.5: Resonance Effect

Q.6: Statement 1: Electronegativity of group 14 elements decreases from Si to Pb. Statement 2: Group 14 has metals, metalloids, and non-metals

- Both statement 1 and 2 are correct
- Both statement 1 and 2 are incorrect
- Statement 1 is correct and Statement 2 is incorrect
- Statement is incorrect and statement 2 is correct

A.6: Statement is incorrect and statement 2 is correct

Q.7: Hydrolysis of protein gives which type of amino acids

A.7: α – amino acids

Q.8: Which of the following statements is incorrect?

- $\Delta G = 0$ for reversible reaction
- $\Delta G < 0$ for spontaneous process
- $\Delta G > 0$ for spontaneous process
- $\Delta G < 0$ for non-spontaneous process

A.8: $\Delta G > 0$ for spontaneous process

Q.9: Assume $K_{\text{net}} = (K_1 \cdot K_2) / K_3$

When $E_{a1} = 40$ kJ/mol, $E_{a2} = 50$ kJ/mol and $E_{a3} = 60$ kJ/mol, calculate the value of $(E_a)_{\text{net}}$ in kJ/mol.

A.9: 30 KJ/mol

Q.10: Which of the following compounds yield a positive Fehling solution test?

A.10: 3

Q.11: How many of the following compounds have one lone pair of electrons in the central atom?

ClF_3 , XeO_3 , BrF_5 , XeF_4 , O_3 , NH_3

A.11: 4

Q.12: How many of the following species have bond order 1 and are paramagnetic as well?
 He_2^{2+} , O_2^{2-} , Ne_2^{2+} , F_2 , B_2 , H_2 , O_2^{2+}

A.12: 1

Q.13: Match the following:

Column I: i. Fluorosparg, ii. Cryolite, iii. Bauxite, iv. Dolomite

Column II: i. $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$, ii. CaF_2 , iii. $\text{MgCO}_3 \cdot \text{CaCO}_3$, iv. $\text{Na}_3[\text{AlF}_6]$

A.13: (A) – q, (B) – s, (C) – p; (D) – r

Q.14: The presence of which element(s) is confirmed by the appearance of blood red color with FeCl_3 in Lassaigne's Test?

A.14: Presence of N & S

Q.15: Statement 1: Ionization energy decreases along a period.

Statement 2: In a period, Z dominates over the screening effect.

- i. Both statements 1 and 2 are correct.
- ii. Both statements 1 and 2 are incorrect.
- iii. Statement 1 is correct and statement 2 is incorrect.
- iv. Statement 1 is incorrect and statement 2 is correct.

A.15: Statement 1 is incorrect and statement 2 is correct.

Q.16: For Rb (37), which of the following set of quantum numbers is correct for the valence electron?

- i. 5, 0, 0, $+1/2$
- ii. 5, 0, 1, $-1/2$
- iii. 5, 0, 1, $+1/2$
- iv. 5, 1, 1, $+1/2$

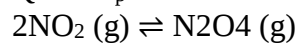
A.16: 5, 0, 0, $+1/2$



Balance the equation and find the values of x, y, z, and p.

A.17: $x = 1, y = 2, z = 1, p = 1$

Q.18: K_p for the following reaction is $36 \times 10^{-2} \text{ atm}^{-1}$



Find out $K_c (\text{M}^{-1})$. Take $R = 0.0821 \text{ l atm}/(\text{mol K})$ and $T = 300 \text{ K}$.

A.18: 9 g