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 KMnO4 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: $\alpha - amino\ acids$

Q.8: Which of the following statements is incorrect?
i. $\Delta G = 0$ for reversible reaction
ii. $\Delta G < 0$ for spontaneous process
iii. $\Delta G > 0$ for spontaneous process
iv. $\Delta G < 0$ for non-spontaneous process

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

Q.9: Assume $K_{net} = (K_1 * K_2)/K_3$
When Ea_1= 40 kJ/mol, Ea_2= 50 kJ/mol and Ea_3= 60 kJ/mol, calculate the value of $(Ea)_{net}$ 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. Fluorospar, ii. Cryolite, iii. Bauxite, iv. Dolomite
Column II: i. $Al_2O_3.H_2O$, ii. CaF_2, iii. $MgCO_3.CaCO_3$, iv. $Na_3[AlF_6]$

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: lonization 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

Q.17: x Cl_2 + y OH^- → z Cl^- + p ClO^-
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 x 10^{-2} atm^{-1}
$2NO_2$ (g) ⇌ N2O4 (g)
Find out Kc (M^{-1}). Take R = 0.0821 l atm/(mol K) and T = 300 K.

A.18: 9 g