Q.1 Which of the following statement(s) is(are) correct for a chemical rection?

Max. score: 2; Neg. score: 0;

- For endothermic reaction the energy of reactants is higher than that of products
- Activation energy is the difference between the energy of product and transition state
- ✔ Activation energy is the difference between the energy of reactant and transition state
- Energy difference between the product and reactant is called the activation energy

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Q.2 pH at which an amino acid gets positively charged?

Max. score: 2; Neg. score: 0;

- pH ~ 6 to 7
- pH = 7
- ✔ pH < 6
- pH > 7

Q.3 Endpoint of an acid base titration shows that 5 ml of NaOH with a concentration of 0.32 M is required for the complete neutralization of the acid used. What is the amount of acid use for the titration if the concentration of the acid is 0.13 M.

Max. score: 2; Neg. score: 0;

- 20.21 ml
- 5.77 ml
- ✔ 12.31 ml
- 2.03 ml

Q.4 Which is the correct order of molar conductivity of K^+, Li^+, F^- and OH^-?

Max. score: 2; Neg. score: 0;

- $K^+ > Li^+ > OH^- > F^-$
- ✔ $OH^- > K^+ > F^- > Li^+$
- $K^+ > Li^+ > F^- > OH^-$
- $OH^- > F^- > K^+ > Li^+$

Q.5 Unit of specific conductivity is,

Max. score: 2; Neg. score: 0;

- ✔ Siemens/m
- mhos
- ✔ Ohm^{-1}/cm
- Siemens/mol

Q.6

Identify the correct statement(s).

Max. score: 2; Neg. score: 0;

- ✔ Crystal field splitting parameter(Δ) is higher for NH_3 compared to H_2O.
- ✔ $[Ni(NH_3)_6]Cl_2$ is violet as it absorbs yellow light.
- ✔ EDTA can acts as a hexadentate ligand.
- ✔ $[Ni(NH_3)_6]Cl_2$ is an octahedral complex.
- ✔ With Ni(II), $EDTA^{4-}$ acts as a stronger ligand than NH_3.

Q.7 The rate constant of a chemical reaction is 2×10^{-2} and 20×10^{-2} at 300 K and 350 K. What is the activation energy for the reaction?

Max. score: 2; Neg. score: 0;

- 78.35 kJ
- ✔ 47.85 kJ/mol
- 30.50 kJ
- 30.50 kJ/mol

Correct Ans = 40.2

Q.8 Which of the following statement is correct regarding activation energy of a reaction?

Max. score: 2; Neg. score: 0;

- ✔ ■ The most probable kinetic energy of reactants increases as the temperature increase
- ✔ ■ For an exothermic reaction, the plot of $ln(k)$ vs T is nonlinear
- ☐ The average kinetic energy of reactant molecules decreases with increasing temperature
- ☐ The intercept of plot of $ln(k)$ vs $1/T$ yields the activation energy of a chemical reaction

Q.9 What is(are) true statement(s)regarding pH metry titration?

Max. score: 2; Neg. score: 0;

- ✔ ■ The pH vs NaOH plot of titration of phosphoric acid shows two isoelectric points
- ✔ ■ Acid dissociation constant can be determined from an acid base titration
- ✔ ■ pH changes rapidly near the iso-electric point
- ■ Linear change in pH in an acid-base titration indicates that the acid is not neutralized

Q.10

Identify the correct statement(s).

Max. score: 2; Neg. score: 0;

Water can easily substitute ammonia from coordination compounds.

In UV-Visible spectroscopy concentration of the compound has no role with the absorbance.

✔ In d-d transition for $[Ni(H_2O)_6]Cl_2$ red light is absorbed hence, it shows a green color.

✔ During the complexometric titration of Ni(II), murexide indicator can act as a ligand.

✔ During the estimation of nickel(II) by EDTA, one mole Ni(II) reacts with one mole of EDTA to form of the Ni-EDTA complex.