

NEET 2017 (Gujarati paper) — Chemistry Question Paper with Solutions

37 Chemistry questions as set in the paper · answers checked by RankUp

NEET 2017 (Gujarati paper) · Q1

1. The electron distribution in d^n coordination complexes depends on magnitude of crystal field splitting, (Δ_o) and pairing energy (P). The condition which favours formation of high spin complexes is:

- (A) $\Delta_o > P$
- (B) $\Delta_o < P$
- (C) $\Delta_o = P$
- (D) $t_{2g}^4 e_g^0$

NEET 2017 (Gujarati paper) · Q2

2. Toluene in the vapour phase is in equilibrium with a solution of benzene and toluene having mole fraction of toluene 0.50. If vapour pressure of pure benzene is 119 torr and that of toluene is 37.0 torr at the same temperature, mole fraction of toluene in vapour phase will be:

- (A) 0.462
- (B) 0.237
- (C) 0.506
- (D) 0.325

NEET 2017 (Gujarati paper) · Q4

3. Which one of the following ions is not tetrahedral in shape?

- (A) NH_4^+
- (B) BF_4^-
- (C) $[\text{Cu}(\text{NH}_3)_4]^{2+}$
- (D) $[\text{NiCl}_4]^{2-}$

NEET 2017 (Gujarati paper) · Q7

4. Amongst the following compounds the one which is most easily sulphonated is:

- (A) Benzene
- (B) Nitro benzene
- (C) Toluene
- (D) Chlorobenzene

NEET 2017 (Gujarati paper) · Q8

5. For the reaction, $\text{XA} + \text{YB} \rightarrow \text{ZC}$, if $-\frac{d[\text{A}]}{dt} = -\frac{d[\text{B}]}{dt} = 1.5 \frac{d[\text{C}]}{dt}$, then the correct statement among the following is:

- (A) The value of $X = Y = Z = 3$
- (B) The value of $X = Y = 3$
- (C) The value of $X = 2$
- (D) The value of $Y = 2$

NEET 2017 (Gujarati paper) · Q9

6. If the rate of the reaction: $\text{R-CO-Z} + \text{Nu}^- \rightarrow \text{R-CO-Nu} + \text{Z}^-$ is fastest, then Z is:

- (A) Cl
- (B) NH_2
- (C) OC_2H_5
- (D) OCOCH_3

NEET 2017 (Gujarati paper) · Q11

7. Of the following alcohols, the one that would react fastest with conc. HCl and anhydrous ZnCl_2 is:

- (A) Butan-1-ol
- (B) Butan-2-ol
- (C) 2-methylpropan-2-ol
- (D) 2-methylpropanol

NEET 2017 (Gujarati paper) · Q12

8. Of the following, the largest value of entropy at 25°C and 1 atm is that of:

- (A) H_2
- (B) C_2H_6
- (C) C_2H_2
- (D) CH_4

NEET 2017 (Gujarati paper) · Q13

9. Which of the following hydrides has the largest bond angle?

- (A) H_2S
- (B) H_2Te
- (C) H_2O
- (D) H_2Se

NEET 2017 (Gujarati paper) · Q14

10. The $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ ion has three unpaired electrons. The hybridization of Co in $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ is:

- (A) sp^3
- (B) dsp^2
- (C) sp^3d^2
- (D) d^2sp^3

NEET 2017 (Gujarati paper) · Q15

11. A hydrocarbon contains 85.7% C. If 42 mg of the compound contains 3.01×10^{20} molecules, the molecular formula of the compound will be:

- (A) C_3H_6
- (B) C_6H_{12}
- (C) $\text{C}_{12}\text{H}_{24}$
- (D) C_2H_4

NEET 2017 (Gujarati paper) · Q16

12. For the tetrahedral complex $[\text{MnBr}_4]^{2-}$, the spin only magnetic moment value is: [At. no. of Mn = 25]

- (A) 1.7
- (B) 5.9
- (C) 4.8
- (D) 2.4

NEET 2017 (Gujarati paper) · Q17

13. Which of the following statements is incorrect?

- (A) In coagulation of a negative sol, flocculating power is in the order of $\text{Al}^{3+} > \text{Ba}^{2+} > \text{Na}^+$
- (B) In the flocculation of a positive sol, flocculating power is in the order, $\text{Cl}^- > \text{SO}_4^{2-} > \text{PO}_4^{3-} > [\text{Fe}(\text{CN})_6]^{4-}$
- (C) Lyophilic colloids have greater affinity for solvents
- (D) Lyophilic sols are more stable than lyophobic sols

NEET 2017 (Gujarati paper) · Q18

14. Which of these artificial sweetener is unstable at cooking temperature?

- (A) Aspartame
- (B) Alitame
- (C) Sucralose
- (D) Saccharin

NEET 2017 (Gujarati paper) · Q20

15. Match the polymer in Column-I to the monomer from Column-II and assign the correct code: Column-I (Polymer): (a) Nylon-6, (b) Dacron, (c) Glyptal, (d) Novolac. Column-II (Monomer): (i) ethylene glycol, terephthalic acid; (ii) urea, formaldehyde; (iii) ethylene glycol, phthalic acid; (iv) phenol, formaldehyde; (v) caprolactam.

- (A) (a)-(v), (b)-(i), (c)-(iii), (d)-(iv)
- (B) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
- (C) (a)-(ii), (b)-(v), (c)-(iii), (d)-(iv)
- (D) (a)-(v), (b)-(iii), (c)-(i), (d)-(ii)

NEET 2017 (Gujarati paper) · Q21

16. Which of the following lanthanoids shows +4 oxidation state to acquire noble gas configuration? (At. nos.: La = 57, Ce = 58, Eu = 63 and Yb = 70)

- (A) Ce
- (B) Yb
- (C) La
- (D) Eu

NEET 2017 (Gujarati paper) · Q22

17. Consider the following sequence of reactions: Benzene $\xrightarrow{(\text{CO}, \text{HCl}, \text{anhydrous } \text{AlCl}_3/\text{CuCl})}$ A $\xrightarrow{(\text{'B'}, \text{OH}^-, 293 \text{ K})}$ $\text{C}_6\text{H}_5\text{-CH=CH-CO-C}_6\text{H}_5$. The substance 'B' is:

- (A) Benzene
- (B) Acetophenone
- (C) Benzaldehyde
- (D) Acetone

NEET 2017 (Gujarati paper) · Q24

18. Which of the following complex ions is not diamagnetic?

- (A) $[\text{Ti}(\text{en})_2(\text{NH}_3)_2]^{4+}$
- (B) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
- (C) $[\text{Zn}(\text{NH}_3)_6]^{2+}$
- (D) $[\text{Sc}(\text{H}_2\text{O})_3(\text{NH}_3)_3]^{3+}$

NEET 2017 (Gujarati paper) · Q25

19. Which of the following absorbs carbon dioxide and releases oxygen?

- (A) CaO
- (B) KO_2
- (C) KOH
- (D) K_2O

NEET 2017 (Gujarati paper) · Q26

20. Among halogens, the one which can oxidise water to oxygen is:

- (A) chlorine
- (B) bromine
- (C) fluorine
- (D) iodine

NEET 2017 (Gujarati paper) · Q27

21. The total number of orbitals present for principle quantum number, $n = 4$ is:

- (A) 12
- (B) 15
- (C) 16
- (D) 30

NEET 2017 (Gujarati paper) · Q28

22. Given that $\Lambda^\circ_m = 133.4$ (AgNO_3); $\Lambda^\circ_m = 149.9$ (KCl); $\Lambda^\circ_m = 144.9 \text{ S cm}^2 \text{ mol}^{-1}$ (KNO_3), the molar conductivity at infinite dilution for AgCl is:

- (A) $140 \text{ S cm}^2 \text{ mol}^{-1}$
- (B) $138 \text{ S cm}^2 \text{ mol}^{-1}$
- (C) $134 \text{ S cm}^2 \text{ mol}^{-1}$
- (D) $132 \text{ S cm}^2 \text{ mol}^{-1}$

NEET 2017 (Gujarati paper) · Q29

23. Consider the reaction between chlorine and nitric oxide $\text{Cl}_2(\text{g}) + 2\text{NO}(\text{g}) \rightarrow 2\text{NOCl}(\text{g})$. On doubling the concentration of both reactants, the rate of the reaction increases by a factor of 8. However, if only the concentration of Cl_2 is doubled, the rate increases by a factor of 2. The order of this reaction with respect to NO is:

- (A) 0
- (B) 1
- (C) 2
- (D) 3

NEET 2017 (Gujarati paper) · Q30

24. Strong reducing behaviour of H_3PO_2 is due to:

- (A) low oxidation state of P
- (B) presence of one $-\text{OH}$ group and two P-H bonds
- (C) presence of two $-\text{OH}$ groups and one P-H bond
- (D) low coordination number of P

NEET 2017 (Gujarati paper) · Q31

25. Under isothermal and reversible conditions, the term "free energy" in thermodynamics signifies:

- (A) non-expansion work done by the system
- (B) expansion work done by the system
- (C) non-expansion work done on the system
- (D) expansion work done on the system

NEET 2017 (Gujarati paper) · Q32

26. The standard equilibrium constant, K_p at 298 K for the reaction, $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ is 5.8×10^5 . The value of standard equilibrium constant, if the concentration of gases is expressed in terms of mol/L, will be: [Given: $R = 0.08314 \text{ L bar K}^{-1} \text{ mol}^{-1}$]

- (A) 3.51×10^6
- (B) 3.84×10^7
- (C) 3.56×10^8
- (D) 3.99×10^9

NEET 2017 (Gujarati paper) · Q33

27. Among the following acids, the strongest acid is:

- (A) NCCH_2COOH
- (B) $\text{O}_2\text{NCH}_2\text{COOH}$
- (C) F_3CCOOH
- (D) Cl_3CCOOH

NEET 2017 (Gujarati paper) · Q34

28. The letter 'D' in D-glucose signifies:

- (A) configuration at all Chiral Carbons
- (B) dextrorotatory
- (C) that it is a monosaccharide
- (D) configuration at the penultimate Chiral Carbon

NEET 2017 (Gujarati paper) · Q35

29. For dry cleaning of clothes instead of tetrachloroethane which is carcinogen in nature, which of the following solvents can be used?

- (A) Liquid CO_2
- (B) H_2O_2
- (C) Liquid O_3
- (D) Petrol

NEET 2017 (Gujarati paper) · Q36

30. Depressant used in the concentration of an ore containing ZnS and PbS is:

- (A) Na_2CO_3
- (B) NaCl
- (C) NaCN
- (D) Na_2SO_4

NEET 2017 (Gujarati paper) · Q37

31. The tendency to form monovalent compounds among the Group 13 elements is correctly exhibited in:

- (A) $\text{B} < \text{Al} < \text{Ga} < \text{In} < \text{Tl}$
- (B) $\text{Tl} < \text{In} < \text{Ga} < \text{Al} < \text{B}$
- (C) $\text{Tl} \approx \text{In} < \text{Ga} < \text{Al} < \text{B}$
- (D) $\text{B} \approx \text{Al} \approx \text{Ga} \approx \text{In} \approx \text{Tl}$

NEET 2017 (Gujarati paper) · Q38

32. Consider the following reaction for which the change in enthalpy is positive.

$2\text{A}(\text{g}) + \text{B}(\text{g}) \rightleftharpoons \text{C}(\text{g}) + \text{D}(\text{g})$. Which of the following will not affect the equilibrium?

- (A) Change in concentration of reactants
- (B) Change in pressure
- (C) Change in temperature
- (D) Presence of catalyst

NEET 2017 (Gujarati paper) · Q40

33. Which of the following will react faster through $\text{S}_{\text{N}}1$ mechanism?

- (A) $\text{H}_2\text{C}=\text{CH}-\text{CH}_2\text{Cl}$
- (B) $\text{C}_6\text{H}_5\text{Cl}$ (chlorobenzene)
- (C) $\text{CH}_2=\text{CHCl}$
- (D) $\text{CH}_3\text{CH}_2\text{Cl}$

NEET 2017 (Gujarati paper) · Q41

34. For the reaction $\text{CO}(\text{g}) + \text{Cl}_2(\text{g}) \rightleftharpoons \text{COCl}_2(\text{g})$, K_p/K_c is equal to:

- (A) $1/RT$
- (B) RT
- (C) $\sqrt{RT}$
- (D) $(RT)^2$

NEET 2017 (Gujarati paper) · Q42

35. Which of the following pair of species is not iso-structural?

- (A) ICl_4^- , XeF_4
- (B) ClO_3^- , CO_3^{2-}
- (C) IBr_2^- , XeF_2
- (D) BrO_3^- , XeO_3

NEET 2017 (Gujarati paper) · Q43

36. Which of the following amino acid is not optically active?

- (A) Proline
- (B) Serine
- (C) Leucine
- (D) Glycine

37. The correct statement regarding ethane conformation is:

- (A) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains a pi (π) bond between the carbon and carbon and ethane has very low melting point.
- (B) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains both sigma (σ) bond and pi (π) bond between the carbon and carbon.
- (C) Rotation around carbon-carbon bond in ethane molecule is possible because of cylindrical symmetry of sigma (σ) bond between carbon-carbon atoms.
- (D) Rotation around carbon-carbon bond in ethane molecule is not possible, because ethane molecule contains both sigma (σ) bond and pi (π) bond between the carbon and carbon and ethane has very high boiling point.

Answer key and explanations**1. Answer: (B) $\Delta_o < P$**

When the crystal field splitting is smaller than the pairing energy, it costs less energy to put electrons in the higher e_g set than to pair them in t_{2g} , so electrons stay unpaired and a high spin complex forms. When Δ_o exceeds P , pairing is preferred and a low spin complex results.

2. Answer: (B) 0.237

By Raoult's law, $p(\text{benzene}) = 0.5 \times 119 = 59.5$ torr and $p(\text{toluene}) = 0.5 \times 37.0 = 18.5$ torr, so total pressure = 78.0 torr. Mole fraction of toluene in vapour = $18.5/78.0 = 0.237$. The vapour is richer in the more volatile benzene, so the toluene fraction must be below 0.50, which rules out 0.506.

3. Answer: (C) $[\text{Cu}(\text{NH}_3)_4]^{2+}$

$[\text{Cu}(\text{NH}_3)_4]^{2+}$ is a d^9 dsp^2 complex and is square planar. NH_4^+ and BF_4^- are sp^3 tetrahedral, and $[\text{NiCl}_4]^{2-}$ with the weak-field Cl^- ligand is sp^3 tetrahedral.

4. Answer: (C) Toluene

Sulphonation is electrophilic substitution, so the ring with the most electron-donating group reacts fastest. The methyl group of toluene activates the ring, while $-\text{NO}_2$ and $-\text{Cl}$ deactivate it compared with benzene.

5. Answer: (B) The value of $X = Y = 3$

Rate = $-(1/X)d[A]/dt = -(1/Y)d[B]/dt = (1/Z)d[C]/dt$. Equal rates of loss of A and B give $X = Y$, and $-d[A]/dt = 1.5 d[C]/dt$ gives $X = 1.5Z$, so the smallest whole numbers are $X = Y = 3$ and $Z = 2$. Z cannot also be 3, because then the rates would be equal, not in the ratio 1.5.

6. Answer: (A) Cl^-

Nucleophilic acyl substitution is fastest when Z^- is the best leaving group, i.e. the weakest base. Cl^- (conjugate base of the strong acid HCl) leaves most easily, so acid chlorides are most reactive; acetate is next, while ethoxide and especially NH_2^- are poor leaving groups.

7. Answer: (C) 2-methylpropan-2-ol

The Lucas reagent reacts through a carbocation, so the tertiary alcohol 2-methylpropan-2-ol, which forms the most stable tertiary carbocation, reacts at once. Secondary butan-2-ol reacts in minutes, and the primary alcohols barely react at room temperature.

8. Answer: (B) C_2H_6

Standard molar entropy rises with molar mass and the number of atoms (more vibrational and rotational freedom). C_2H_6 (about $229 \text{ J K}^{-1} \text{ mol}^{-1}$) exceeds C_2H_2 (about 201), CH_4 (about 186) and H_2 (about 131).

9. Answer: (C) H_2O

Oxygen is the smallest and most electronegative central atom, so the bonding pairs sit close to it and repel strongly, keeping the angle near 104.5° . Down the group the bonding pairs move away and the angle falls towards 90° (H_2S about 92° , H_2Te about 90°).

10. Answer: (C) sp^3d^2

Co^{2+} is $3d^7$. Three unpaired electrons means the weak-field water ligands do not force pairing, so the inner 3d orbitals are not free and the six ligands use 4s, 4p and 4d orbitals: sp^3d^2 (outer orbital, octahedral). d^2sp^3 would need pairing down to one unpaired electron.

11. Answer: (B) C₆H₁₂

Moles = $3.01 \times 10^{20} / 6.02 \times 10^{23} = 5 \times 10^{-4}$ mol, so molar mass = $0.042 \text{ g} / 5 \times 10^{-4} \text{ mol} = 84 \text{ g mol}^{-1}$. 85.7% C corresponds to the empirical formula CH₂ (14 g mol^{-1}), and $84/14 = 6$ gives C₆H₁₂. All options have 85.7% C, so only the molar mass separates them.

12. Answer: (B) 5.9

Mn²⁺ is 3d⁵, and in a tetrahedral field with weak Br⁻ ligands all five electrons stay unpaired. $\mu = \sqrt{n(n+2)} = \sqrt{35} \approx 5.9 \text{ BM}$.

13. Answer: (B) In the flocculation of a positive sol, flocculating power is in the order, Cl⁻ > SO₄²⁻ > PO₄³⁻ > [Fe(CN)₆]⁴⁻

By the Hardy-Schulze rule, coagulating power rises with the charge of the oppositely charged ion, so for a positive sol the correct order is [Fe(CN)₆]⁴⁻ > PO₄³⁻ > SO₄²⁻ > Cl⁻, the reverse of the statement. The order for cations acting on a negative sol is correctly stated.

14. Answer: (A) Aspartame

Aspartame, a methyl ester of a dipeptide, breaks down on heating and is used only in cold foods and drinks. Sucralose, saccharin and alitame are heat-stable.

15. Answer: (A) (a)-(v), (b)-(i), (c)-(iii), (d)-(iv)

Nylon-6 is made from caprolactam, Dacron from ethylene glycol and terephthalic acid, Glyptal from ethylene glycol and phthalic acid, and Novolac from phenol and formaldehyde. Urea-formaldehyde gives a different resin, so any code pairing Novolac with it is wrong.

16. Answer: (A) Ce

Ce is [Xe]4f¹5d¹6s²; losing four electrons gives Ce⁴⁺ with the noble gas configuration [Xe]. Eu and Yb show +2 to reach stable 4f⁷ and 4f¹⁴, and La shows only +3, which already gives [Xe].

17. Answer: (B) Acetophenone

The Gattermann-Koch reaction converts benzene into benzaldehyde, the intermediate A. A base-catalysed cross aldol (Claisen-Schmidt) condensation of benzaldehyde with acetophenone, C₆H₅COCH₃, then gives benzalacetophenone, C₆H₅CH=CHCOC₆H₅. Acetone would give C₆H₅CH=CHCOCH₃, not the diphenyl product.

18. Answer: (B) [Cr(NH₃)₆]³⁺

Cr³⁺ is 3d³, with three unpaired electrons in t_{2g}, so [Cr(NH₃)₆]³⁺ is paramagnetic. Ti⁴⁺ and Sc³⁺ are d⁰ and Zn²⁺ is d¹⁰, so those complexes have no unpaired electrons and are diamagnetic.

19. Answer: (B) KO₂

Potassium superoxide reacts as $4\text{KO}_2 + 2\text{CO}_2 \rightarrow 2\text{K}_2\text{CO}_3 + 3\text{O}_2$, so it removes CO₂ and supplies O₂ (used in breathing apparatus). CaO, KOH and K₂O absorb CO₂ but release no oxygen.

20. Answer: (C) fluorine

Fluorine is the strongest oxidising agent ($E^\circ = +2.87 \text{ V}$) and oxidises water: $2\text{F}_2 + 2\text{H}_2\text{O} \rightarrow 4\text{HF} + \text{O}_2$. Chlorine and bromine react with water only to form hypohalous and hydrohalic acids, and iodine is too weak.

21. Answer: (C) 16

The number of orbitals in a shell is n², so n = 4 has 16 orbitals (one 4s, three 4p, five 4d, seven 4f). 32 would be the number of electrons, 2n².

22. Answer: (B) 138 S cm² mol⁻¹

By Kohlrausch's law, $\Lambda^\circ(\text{AgCl}) = \Lambda^\circ(\text{AgNO}_3) + \Lambda^\circ(\text{KCl}) - \Lambda^\circ(\text{KNO}_3) = 133.4 + 149.9 - 144.9 = 138.4 \approx 138 \text{ S cm}^2 \text{ mol}^{-1}$. Adding all three, or subtracting the wrong salt, gives none of the ion combinations needed.

23. Answer: (C) 2

Let rate = $k[\text{Cl}_2]^x[\text{NO}]^y$. Doubling Cl₂ alone doubles the rate, so x = 1. Doubling both gives $2^1 \times 2^y = 8$, so $2^y = 4$ and y = 2. The overall order is 3, which is the trap.

24. Answer: (B) presence of one -OH group and two P-H bonds

Hypophosphorous acid, H₃PO₂, has one P-OH and two P-H bonds; the P-H bonds are what make phosphorus oxyacids reducing, and with two of them H₃PO₂ is a strong reducing agent. Two -OH groups and one P-H bond describe H₃PO₃, a weaker reductant.

25. Answer: (A) non-expansion work done by the system

At constant temperature and pressure for a reversible change, -ΔG equals the maximum useful (non-expansion) work the system can do, such as electrical work in a cell. Expansion (PV) work is already accounted for in the enthalpy term and is not what ΔG measures.

26. Answer: (C) 3.56×10^8

$K_p = K_c(RT)^{\Delta n}$ with $\Delta n = 2 - 4 = -2$, so $K_c = K_p(RT)^2$. $RT = 0.08314 \times 298 = 24.78$, $(RT)^2 = 613.9$, and $K_c = 5.8 \times 10^5 \times 613.9 \approx 3.56 \times 10^8$. Dividing by $(RT)^2$ instead would give a much smaller value.

27. Answer: (C) F_3CCOOH

Electron-withdrawing groups on the α -carbon stabilise the carboxylate ion. Three fluorine atoms, the most electronegative, withdraw electrons most strongly, making trifluoroacetic acid the strongest (pK_a about 0.2), ahead of trichloroacetic acid and the single-substituent acids.

28. Answer: (D) configuration at the penultimate Chiral Carbon

'D' refers to the relative configuration of the lowest (penultimate) chiral carbon, C-5 in glucose, which matches D-glyceraldehyde ($-OH$ on the right). It says nothing about the sign of rotation; that is shown by (+) or (−), and D-fructose, for example, is laevorotatory.

29. Answer: (A) Liquid CO_2

Liquid (supercritical) CO_2 with a suitable detergent is the green-chemistry replacement for chlorinated dry-cleaning solvents. It is non-toxic and non-flammable, unlike petrol, and does not bleach fabrics the way H_2O_2 does.

30. Answer: (C) $NaCN$

In froth flotation of a mixed ZnS/PbS ore, $NaCN$ forms a complex on the ZnS surface and stops it from frothing, so PbS floats off first. Na_2CO_3 , $NaCl$ and Na_2SO_4 do not act selectively in this way.

31. Answer: (A) $B < Al < Ga < In < Tl$

Down group 13 the ns^2 electrons become increasingly reluctant to take part in bonding (inert pair effect), so the +1 state becomes more stable from B to Tl. Thallium mainly forms $Tl(I)$ compounds, while boron hardly shows +1 at all.

32. Answer: (D) Presence of catalyst

A catalyst speeds up the forward and backward reactions equally, so equilibrium is reached faster but its position and K do not change. Since $\Delta n = -1$, pressure shifts the equilibrium; changing temperature changes K for this endothermic reaction; and changing reactant concentration shifts the position.

33. Answer: (A) $H_2C=CH-CH_2Cl$

S_N1 rate depends on carbocation stability. Allyl chloride ionises to the resonance-stabilised allyl cation, so it reacts fastest. Ethyl chloride would give an unstable primary cation, and vinyl and aryl chlorides have a $C-Cl$ bond with partial double-bond character and do not ionise easily.

34. Answer: (A) $1/RT$

$K_p = K_c(RT)^{\Delta n}$, and here $\Delta n = 1 - 2 = -1$. So $K_p/K_c = (RT)^{-1} = 1/RT$. RT would be the answer if the number of gas moles increased by one.

35. Answer: (B) ClO_3^- , CO_3^{2-}

ClO_3^- has three bond pairs and one lone pair on Cl (sp^3), so it is trigonal pyramidal, whereas CO_3^{2-} is sp^2 trigonal planar. ICl_4^- and XeF_4 are both square planar, IBr_2^- and XeF_2 both linear, and BrO_3^- and XeO_3 both pyramidal.

36. Answer: (D) Glycine

Glycine, H_2N-CH_2-COOH , has two hydrogens on its α -carbon, so it has no chiral centre and is optically inactive. Proline, serine and leucine all have an α -carbon with four different groups.

37. Answer: (C) Rotation around carbon-carbon bond in ethane molecule is possible because of cylindrical symmetry of sigma (σ) bond between carbon-carbon atoms.

Ethane has only a $C-C$ σ bond, and a σ bond is cylindrically symmetric about the bond axis, so its overlap does not change as the groups rotate; this free rotation produces the staggered and eclipsed conformations. Ethane has no π bond, so the statements saying rotation is blocked by a π bond are false.

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