

NEET 2013 — Chemistry Question Paper with Solutions

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

NEET 2013

1. The value of Planck's constant is 6.63×10^{-34} J s. The speed of light is 3×10^{17} nm s^{-1} . Which value is closest to the wavelength in nanometre of a quantum of light with frequency of 6×10^{15} s^{-1} ?

- (A) 10
- (B) 25
- (C) 50
- (D) 75

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2. What is the maximum number of electrons that can be associated with the following set of quantum numbers? $n = 3$, $l = 1$ and $m = -1$.

- (A) 10
- (B) 6
- (C) 4
- (D) 2

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3. What is the activation energy for a reaction if its rate doubles when the temperature is raised from 20°C to 35°C ? ($R = 8.314$ J mol^{-1} K^{-1})

- (A) 342 kJ mol^{-1}
- (B) 269 kJ mol^{-1}
- (C) 34.7 kJ mol^{-1}
- (D) 15.1 kJ mol^{-1}

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4. A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of $\text{pH} = 10$ and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be

- (A) 0.059 V
- (B) 0.59 V
- (C) 0.118 V
- (D) 1.18 V

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5. A reaction having equal energies of activation for forward and reverse reactions has

- (A) $\Delta S = 0$
- (B) $\Delta G = 0$
- (C) $\Delta H = 0$
- (D) $\Delta H = \Delta G = \Delta S = 0$

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6. At 25°C molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is $9.54 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ and at infinite dilution its molar conductance is $238 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$. The degree of ionisation of ammonium hydroxide at the same concentration and temperature is

- (A) 2.080%
- (B) 20.800%
- (C) 4.008%
- (D) 40.800%

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7. Based on equation $E = -2.178 \times 10^{-18} \text{ J } (Z^2/n^2)$, certain conclusions are written. Which of them is not correct?

- (A) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus
- (B) Larger the value of n , the larger is the orbit radius
- (C) Equation can be used to calculate the change in energy when the electron changes orbit
- (D) For $n = 1$, the electron has a more negative energy than it does for $n = 6$ which means that the electron is more loosely bound in the smallest allowed orbit

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8. A button cell used in watches functions as following:



If half cell potentials are



The cell potential will be

- (A) 1.10 V
- (B) 0.42 V
- (C) 0.84 V
- (D) 1.34 V

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9. How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3 ? The concentrated acid is 70% HNO_3 .

- (A) 45.0 g conc. HNO_3
- (B) 90.0 g conc. HNO_3
- (C) 70.0 g conc. HNO_3
- (D) 54.0 g conc. HNO_3

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10. A magnetic moment of 1.73 BM will be shown by one among the following

- (A) $[\text{Cu}(\text{NH}_3)_4]^{2+}$
- (B) $[\text{Ni}(\text{CN})_4]^{2-}$
- (C) TiCl_4
- (D) $[\text{CoCl}_6]^{4-}$

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11. Which of the following is paramagnetic ?

- (A) CO
- (B) O_2^-
- (C) CN^-
- (D) NO^+

NEET 2013 · Q55

12. The number of carbon atoms per unit cell of diamond unit cell is

- (A) 4
- (B) 8
- (C) 6
- (D) 1

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13. Reaction by which benzaldehyde cannot be prepared

- (A) Toluene + CrO_2Cl_2 in CS_2 followed by H_3O^+
- (B) Benzoyl chloride ($\text{C}_6\text{H}_5\text{COCl}$) + H_2 in presence of Pd-BaSO_4
- (C) Benzene + CO + HCl in presence of anhydrous AlCl_3
- (D) Benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$) + Zn/Hg and conc. HCl

NEET 2013 · Q56

14. Maximum deviation from ideal gas is expected from :

- (A) $\text{H}_2(\text{g})$
- (B) $\text{N}_2(\text{g})$
- (C) $\text{CH}_4(\text{g})$
- (D) $\text{NH}_3(\text{g})$

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15. Which of the following does not give oxygen on heating ?

- (A) KClO_3
- (B) $\text{Zn}(\text{ClO}_3)_2$
- (C) $\text{K}_2\text{Cr}_2\text{O}_7$
- (D) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

NEET 2013 · Q57

16. A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm^{-3} . The molar mass of the metal is ($N_A = \text{Avogadro's constant} = 6.02 \times 10^{23} \text{ mol}^{-1}$)

- (A) 40 g mol^{-1}
- (B) 30 g mol^{-1}
- (C) 27 g mol^{-1}
- (D) 20 g mol^{-1}

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17. Which of the following lanthanoid ions is diamagnetic ? (At. No. Ce = 58, Sm = 62, Eu = 63, Yb = 70)

- (A) Ce^{2+}
- (B) Sm^{2+}
- (C) Eu^{2+}
- (D) Yb^{2+}

NEET 2013 · Q58

18. Dipole-induced dipole interactions are present in which of the following pairs?

- (A) H_2O and alcohol
- (B) Cl_2 and CCl_4
- (C) HCl and He atoms
- (D) SiF_4 and He atoms

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19. Identify the correct order of solubility in aqueous medium

- (A) $\text{CuS} > \text{ZnS} > \text{Na}_2\text{S}$
- (B) $\text{ZnS} > \text{Na}_2\text{S} > \text{CuS}$
- (C) $\text{Na}_2\text{S} > \text{CuS} > \text{ZnS}$
- (D) $\text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$

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20. XeF_2 is isostructural with

- (A) TeF_2
- (B) ICl_2^-
- (C) SbCl_3
- (D) BaCl_2

NEET 2013 · Q60

21. Roasting of sulphides gives the gas X as a byproduct. This is a colourless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueous solution is acidic, acts as a reducing agent and its acid has never been isolated. The gas X is

- (A) H_2S
- (B) SO_2
- (C) CO_2
- (D) SO_3

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22. An excess of AgNO_3 is added to 100 mL of a 0.01 M solution of dichlorotetraaquachromium(III) chloride. The number of moles of AgCl precipitated would be

- (A) 0.001
- (B) 0.002
- (C) 0.003
- (D) 0.01

NEET 2013 · Q61

23. Which is the strongest acid in the following ?

- (A) H_2SO_4
- (B) HClO_3
- (C) HClO_4
- (D) H_2SO_3

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24. Which of these is least likely to act as a Lewis base ?

- (A) CO
- (B) F^-
- (C) BF_3
- (D) PF_3

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25. KMnO_4 can be prepared from K_2MnO_4 as per the reaction: $3\text{MnO}_4^{2-} + 2\text{H}_2\text{O} \rightleftharpoons 2\text{MnO}_4^- + \text{MnO}_2 + 4\text{OH}^-$. The reaction can go to completion by removing OH^- ions by adding

- (A) HCl
- (B) KOH
- (C) CO_2
- (D) SO_2

NEET 2013 · Q63

26. Which of the following structure is similar to graphite ?

- (A) BN
- (B) B
- (C) B_4C
- (D) B_2H_6

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27. Which of the following is electron-deficient?

- (A) $(\text{CH}_3)_2$
- (B) $(\text{SiH}_3)_2$
- (C) $(\text{BH}_3)_2$
- (D) PH_3

NEET 2013 · Q64

28. The basic structural unit of silicates is

- (A) SiO^-
- (B) SiO_4^{4-}
- (C) SiO_3^{2-}
- (D) SiO_4^{2-}

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29. Which of the following statements about the interstitial compounds is incorrect?

- (A) They retain metallic conductivity
- (B) They are chemically reactive
- (C) They are much harder than the pure metal
- (D) They have higher melting points than the pure metal

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30. Which one of the following molecules contains no π bond?

- (A) CO_2
- (B) H_2O
- (C) SO_2
- (D) NO_2

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31. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

- (A) $\text{CH}_3\text{--CH}_2\text{--CH}_2\text{--CH}_2\text{--O--CH}_3$
- (B) $\text{CH}_3\text{--CH}_2\text{--CH(CH}_3\text{)--O--CH}_3$
- (C) $(\text{CH}_3)_3\text{C--O--CH}_3$
- (D) $(\text{CH}_3)_2\text{CH--CH}_2\text{--O--CH}_3$

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32. The structure of isobutyl group in an organic compound is

- (A) $(\text{CH}_3)_2\text{CH--CH}_2\text{--}$
- (B) $\text{CH}_3\text{--CH(---)--CH}_2\text{--CH}_3$
- (C) $\text{CH}_3\text{--CH}_2\text{--CH}_2\text{--CH}_2\text{--}$
- (D) $(\text{CH}_3)_3\text{C--}$

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33. Nitrobenzene on reaction with conc. $\text{HNO}_3/\text{H}_2\text{SO}_4$ at $80\text{--}100^\circ\text{C}$ forms which one of the following products?

- (A) 1,2-Dinitrobenzene
- (B) 1,3-Dinitrobenzene
- (C) 1,4-Dinitrobenzene
- (D) 1,2,4-Trinitrobenzene

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34. Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating?

- (A) $\text{--C}\equiv\text{N}$
- (B) $\text{--SO}_3\text{H}$
- (C) --COOH
- (D) --NO_2

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35. 6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of solution is

- (A) 0.02 M
- (B) 0.01 M
- (C) 0.001 M
- (D) 0.1 M

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36. Which of the following is a polar molecule ?

- (A) BF_3
- (B) SF_4
- (C) SiF_4
- (D) XeF_4

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37. In the reaction

2-bromo-4-nitrobenzenediazonium chloride $\xrightarrow{\text{A}}$ m-bromonitrobenzene

A is

- (A) $\text{HgSO}_4/\text{H}_2\text{SO}_4$
- (B) Cu_2Cl_2
- (C) H_3PO_2 and H_2O
- (D) $\text{H}^+/\text{H}_2\text{O}$

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38. The order of stability of the following tautomeric compounds is

(I) $\text{CH}_2=\text{C}(\text{OH})-\text{CH}_2-\text{CO}-\text{CH}_3$

(II) $\text{CH}_3-\text{CO}-\text{CH}_2-\text{CO}-\text{CH}_3$

(III) $\text{CH}_3-\text{C}(\text{OH})=\text{CH}-\text{CO}-\text{CH}_3$

- (A) $\text{I} > \text{II} > \text{III}$
- (B) $\text{III} > \text{II} > \text{I}$
- (C) $\text{II} > \text{I} > \text{III}$
- (D) $\text{II} > \text{III} > \text{I}$

NEET 2013 · Q75

39. Which of these is not a monomer for a high molecular mass silicone polymer?

- (A) MeSiCl_3
- (B) Me_2SiCl_2
- (C) Me_3SiCl
- (D) PhSiCl_3

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40. Which of the following compounds will not undergo Friedel-Crafts reaction easily?

- (A) Cumene
- (B) Xylene
- (C) Nitrobenzene
- (D) Toluene

NEET 2013 · Q78

41. Antiseptics and disinfectants either kill or prevent growth of microorganisms.

Identify which of the following statements is not true

- (A) A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant
- (B) Chlorine and iodine are used as strong disinfectants
- (C) Dilute solutions of boric acid and hydrogen peroxide are strong antiseptics
- (D) Disinfectants harm the living tissues

NEET 2013 · Q80

42. Nylon is an example of-

- (A) Polyester
- (B) Polysaccharide
- (C) Polyamide
- (D) Polythene

43. Which is the monomer of neoprene in the following?

- (A) $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$
- (B) $\text{CH}_2=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$
- (C) $\text{CH}_2=\text{C}(\text{Cl})-\text{CH}=\text{CH}_2$
- (D) $\text{CH}_2=\text{CH}-\text{C}\equiv\text{CH}$

Answer key and explanations

1. Answer: (C) 50

$\lambda = c/\nu = (3 \times 10^{17} \text{ nm s}^{-1})/(6 \times 10^{15} \text{ s}^{-1}) = 50 \text{ nm}$. Planck's constant is not needed to find the wavelength.

2. Answer: (D) 2

$n = 3, l = 1, m = -1$ specifies one particular 3p orbital. One orbital holds at most two electrons with opposite spins. 6 is the capacity of the whole 3p subshell.

3. Answer: (C) 34.7 kJ mol⁻¹

$\log(k_2/k_1) = (E_a/2.303R)(T_2 - T_1)/(T_1T_2)$ with $T_1 = 293 \text{ K}$, $T_2 = 308 \text{ K}$. $E_a = 2.303 \times 8.314 \times 0.3010 \times (293 \times 308)/15 = 5.763 \times 6016 \approx 3.47 \times 10^4 \text{ J mol}^{-1} = 34.7 \text{ kJ mol}^{-1}$.

4. Answer: (B) 0.59 V

For $\text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^-$ at 1 atm, $E(\text{oxidation}) = 0 - (0.059/2) \log[\text{H}^+]^2 = -0.059 \log[\text{H}^+] = 0.059 \times \text{pH}$. With pH 10: $0.059 \times 10 = 0.59 \text{ V}$. 0.059 V would correspond to pH 1.

5. Answer: (C) $\Delta H = 0$

$\Delta H = E_a(\text{forward}) - E_a(\text{reverse})$. If the two activation energies are equal, $\Delta H = 0$. ΔG and ΔS need not be zero, since they also depend on entropy changes.

6. Answer: (C) 4.008%

Degree of ionisation $\alpha = \Lambda_m/\Lambda^\circ_m = 9.54/238 = 0.04008$, i.e. 4.008%. 40.8% comes from misplacing the decimal.

7. Answer: (D) For $n = 1$, the electron has a more negative energy than it does for $n = 6$ which means that the electron is more loosely bound in the smallest allowed orbit

For $n = 1$ the energy is the most negative, which means the electron is most tightly bound in the smallest orbit, not more loosely bound, so that conclusion is wrong. The other statements correctly describe the negative sign, the growth of radius with n and use of the equation for energy changes.

8. Answer: (A) 1.10 V

Zinc is oxidised (anode) and Ag_2O reduced (cathode). $E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}} = 0.34 - (-0.76) = 1.10 \text{ V}$. Subtracting the magnitudes gives 0.42 V, which ignores the sign of the zinc potential.

9. Answer: (A) 45.0 g conc. HNO_3

Moles of $\text{HNO}_3 = 2.0 \times 0.250 = 0.50 \text{ mol} = 0.50 \times 63 = 31.5 \text{ g}$. The 70% solution needed = $31.5/0.70 = 45.0 \text{ g}$. 90 g comes from doubling the moles.

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

1.73 BM = $\sqrt{n(n+2)}$ with $n = 1$ unpaired electron. Cu^{2+} ($3d^9$) in $[\text{Cu}(\text{NH}_3)_4]^{2+}$ has one unpaired electron. $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar and diamagnetic, TiCl_4 has Ti^{4+} ($3d^0$), and $[\text{CoCl}_6]^{4-}$ has high-spin Co^{2+} ($3d^7$) with three unpaired electrons.

11. Answer: (B) O_2^-

CO , CN^- and NO^+ are isoelectronic with 14 electrons and have all electrons paired. O_2^- has 17 electrons, with one unpaired electron in a π^* orbital, so it is paramagnetic.

12. Answer: (B) 8

Diamond has an fcc arrangement (4 atoms per cell) with half of the 8 tetrahedral voids also occupied (4 more atoms), giving 8 carbon atoms per unit cell. 4 counts only the fcc lattice points.

13. Answer: (D) Benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$) + Zn/Hg and conc. HCl

Etard reaction (toluene + CrO_2Cl_2), Rosenmund reduction (benzoyl chloride + $\text{H}_2/\text{Pd}-\text{BaSO}_4$) and Gattermann-Koch reaction (benzene + $\text{CO} + \text{HCl}/\text{AlCl}_3$) all give benzaldehyde. Zn/Hg with conc. HCl (Clemmensen conditions) does not convert benzoic acid into benzaldehyde.

14. Answer: (D) $\text{NH}_3(\text{g})$

Deviation from ideal behaviour grows with intermolecular attraction. NH_3 is polar and hydrogen-bonded, so it liquefies easily and deviates most. H_2 , N_2 and CH_4 have only weak dispersion forces.

15. Answer: (D) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

$(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{N}_2 + \text{Cr}_2\text{O}_3 + 4\text{H}_2\text{O}$ on heating, releasing nitrogen, not oxygen. KClO_3 and $\text{Zn}(\text{ClO}_3)_2$ release O_2 , and $\text{K}_2\text{Cr}_2\text{O}_7$ on strong heating gives K_2CrO_4 , Cr_2O_3 and O_2 .

16. Answer: (C) 27 g mol^{-1}

$M = \rho a^3 N_A / Z$ with $Z = 4$ for fcc, $a = 404 \text{ pm} = 4.04 \times 10^{-8} \text{ cm}$: $a^3 = 6.594 \times 10^{-23} \text{ cm}^3$. $M = 2.72 \times 6.594 \times 10^{-23} \times 6.02 \times 10^{23} / 4 \approx 27.0 \text{ g mol}^{-1}$ (aluminium).

17. Answer: (D) Yb^{2+}

Yb ($Z = 70$) is $[\text{Xe}]4f^{14}6s^2$, so Yb^{2+} is $4f^{14}$ with every electron paired: diamagnetic. Ce^{2+} ($4f^2$), Sm^{2+} ($4f^6$) and Eu^{2+} ($4f^7$) all have unpaired f electrons.

18. Answer: (C) HCl and He atoms

HCl has a permanent dipole, which induces a temporary dipole in the non-polar He atom: a dipole-induced dipole interaction. Water and alcohol have dipole-dipole (H-bond) forces, while Cl_2/CCl_4 and SiF_4/He are both non-polar, giving only dispersion forces.

19. Answer: (D) $\text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$

Na_2S is an ionic alkali-metal sulphide and is freely soluble. ZnS ($K_{sp} \approx 10^{-22}$) is sparingly soluble, and CuS ($K_{sp} \approx 10^{-36}$) is far less soluble. So the order is $\text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$.

20. Answer: (B) ICl_2^-

XeF_2 has 5 electron pairs (2 bond pairs, 3 lone pairs), sp^3d , and is linear. ICl_2^- also has 2 bond pairs and 3 lone pairs, so it is linear too. TeF_2 is bent and SbCl_3 is pyramidal; BaCl_2 is an ionic solid.

21. Answer: (B) SO_2

Roasting sulphide ores gives SO_2 , a colourless gas with the choking smell of burning sulphur that contributes to acid rain. Its aqueous solution, H_2SO_3 , is acidic and reducing but has never been isolated. H_2S smells of rotten eggs, and SO_3 is not produced as the main by-product.

22. Answer: (A) 0.001

Dichlorotetraaquachromium(III) chloride is $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl}$, with only one chloride outside the coordination sphere. Moles of complex = $0.01 \times 0.100 = 0.001 \text{ mol}$, giving 0.001 mol AgCl . Coordinated chlorides are not precipitated, so 0.003 is wrong.

23. Answer: (C) HClO_4

HClO_4 has chlorine in its highest oxidation state (+7), and its conjugate base ClO_4^- is highly stabilised by resonance, making it the strongest acid. H_2SO_4 is strong but weaker than HClO_4 , while HClO_3 and H_2SO_3 are weaker still.

24. Answer: (C) BF_3

A Lewis base donates an electron pair. CO , F^- and PF_3 all have lone pairs to donate, but boron in BF_3 has only six valence electrons and accepts a pair, so BF_3 is a Lewis acid.

25. Answer: (C) CO_2

CO_2 is weakly acidic and neutralises OH^- (forming carbonate) without reacting with the permanganate, pushing the equilibrium to the right. HCl and SO_2 are reducing agents that would be oxidised by MnO_4^- , and KOH would add OH^- and push the reaction backwards.

26. Answer: (A) BN

Hexagonal boron nitride, known as 'inorganic graphite', has flat layers of alternating B and N atoms in hexagons, like graphite. Elemental boron and B_4C have three-dimensional network structures, and B_2H_6 is a molecular hydride.

27. Answer: (C) $(\text{BH}_3)_2$

$(\text{BH}_3)_2$ is diborane, B_2H_6 . Each boron has only three valence electrons, so the molecule lacks enough electrons for normal two-electron bonds and uses 3-centre-2-electron B-H-B bonds: it is electron deficient. Ethane, disilane and PH_3 have complete octets.

28. Answer: (B) SiO_4^{4-}

All silicates are built from the SiO_4^{4-} tetrahedron, with Si at the centre and four O atoms at the corners. Sharing corners gives chains, sheets and frameworks, but the basic unit stays SiO_4^{4-} .

29. Answer: (B) They are chemically reactive

Interstitial compounds (small atoms like H, C, N trapped in metal lattices) keep metallic conductivity, are very hard and have high melting points, but they are chemically inert. So calling them chemically reactive is incorrect.

30. Answer: (B) H_2O

H_2O has only two O-H σ bonds. CO_2 ($\text{O}=\text{C}=\text{O}$), SO_2 and NO_2 all contain double-bond character and so π bonds.

31. Answer: (C) $(\text{CH}_3)_3\text{C-O-CH}_3$

With tert-butyl methyl ether, HI cleavage goes by $\text{S}_{\text{N}}1$ through the stable tert-butyl carbocation, giving tert-butyl iodide and methyl alcohol. For the primary and secondary alkyl methyl ethers the reaction is $\text{S}_{\text{N}}2$, where I^- attacks the less hindered methyl group, giving methyl iodide and the other alcohol.

32. Answer: (A) $(\text{CH}_3)_2\text{CH-CH}_2-$

Isobutyl is $(\text{CH}_3)_2\text{CH-CH}_2-$, attached through a CH_2 next to the branched carbon. $\text{CH}_3\text{-CH(-)-CH}_2\text{-CH}_3$ is sec-butyl, $(\text{CH}_3)_3\text{C-}$ is tert-butyl and the straight chain is n-butyl.

33. Answer: (B) 1,3-Dinitrobenzene

$-\text{NO}_2$ is a strong deactivating, meta-directing group, so the second nitro group enters the meta position, giving 1,3-dinitrobenzene. Ortho/para dinitro products would need an ortho/para-directing group.

34. Answer: (D) $-\text{NO}_2$

All four groups withdraw electrons and are meta directing, but $-\text{NO}_2$ deactivates the ring most strongly through its large $-\text{I}$ and $-\text{R}$ effects. $-\text{C}\equiv\text{N}$, $-\text{SO}_3\text{H}$ and $-\text{COOH}$ are deactivating but less so.

35. Answer: (B) 0.01 M

Moles of urea = $6.02 \times 10^{20} / 6.02 \times 10^{23} = 1 \times 10^{-3}$ mol in 100 mL = 0.1 L. Molarity = $10^{-3} / 0.1 = 0.01$ M. 0.001 M forgets to convert 100 mL into litres.

36. Answer: (B) SF_4

SF_4 has four bond pairs and one lone pair (see-saw shape), so its bond dipoles do not cancel and it is polar. BF_3 (trigonal planar), SiF_4 (tetrahedral) and XeF_4 (square planar) are symmetric, so they are non-polar.

37. Answer: (C) H_3PO_2 and H_2O

Removing the diazonium group at C-1 leaves Br at C-2 and NO_2 at C-4, which are meta to each other, so the reagent must replace $-\text{N}_2^+$ by H. Hypophosphorous acid (H_3PO_2) with water does this. Cu_2Cl_2 would introduce Cl and $\text{H}^+/\text{H}_2\text{O}$ would give a phenol.

38. Answer: (B) $\text{III} > \text{II} > \text{I}$

III is the enol of acetylacetone; its $\text{C}=\text{C}$ is conjugated with the $\text{C}=\text{O}$ and it forms a six-membered intramolecular hydrogen bond, so it is the most stable. The keto form II comes next, and I, whose $\text{C}=\text{C}$ is not conjugated with the carbonyl, is least stable: $\text{III} > \text{II} > \text{I}$.

39. Answer: (C) Me_3SiCl

Me_3SiCl has only one hydrolysable Si-Cl bond, so after hydrolysis it can bond only at one end and acts as a chain stopper. Me_2SiCl_2 forms chains, and MeSiCl_3 and PhSiCl_3 give cross-linking, building high-molecular-mass silicones.

40. Answer: (C) Nitrobenzene

The $-\text{NO}_2$ group strongly deactivates the ring and also complexes with AlCl_3 , so nitrobenzene does not undergo Friedel-Crafts reactions easily. Cumene, xylene and toluene have activating alkyl groups and react readily.

41. Answer: (C) Dilute solutions of boric acid and hydrogen peroxide are strong antiseptics

Dilute boric acid and dilute hydrogen peroxide are weak (mild) antiseptics, so calling them strong is not true. The other statements are correct: 0.2% phenol is an antiseptic and 1% a disinfectant, chlorine and iodine are strong disinfectants, and disinfectants harm living tissue.

42. Answer: (C) Polyamide

Nylons such as nylon-6,6 are formed by condensation of a diamine with a dicarboxylic acid, producing amide ($-\text{CO-NH}-$) links, so nylon is a polyamide. Polyesters like terylene have ester links instead.

43. Answer: (C) $\text{CH}_2=\text{C}(\text{Cl})-\text{CH}=\text{CH}_2$

Neoprene is polychloroprene, made from chloroprene (2-chlorobuta-1,3-diene), $\text{CH}_2=\text{C}(\text{Cl})-\text{CH}=\text{CH}_2$. Buta-1,3-diene is the monomer of polybutadiene/Buna rubbers and isoprene is the monomer of natural rubber.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.