

NEST Chemistry Sample Paper – 1

Duration: 45 Minutes

Maximum Marks: 60

Instructions

- This paper contains **20 Multiple Choice Questions (single correct answer)**, modelled on the Chemistry section of **NEST 2026**.
- Each correct answer carries **+3 marks**. There is a deduction of **–1 mark** for each incorrect answer; **no marks** are deducted for an unattempted question.
- Every question has exactly **four options**, of which only **one** is correct. Choose carefully.
- Personal calculators, log tables, mobile phones, and other electronic gadgets are strictly prohibited in the examination hall.
- A simple on-screen (virtual) calculator is provided in the computer-based test interface and may be used; blank sheets for rough work are supplied at the exam centre.

Q1. An organic compound contains 40% carbon, 6.7% hydrogen and 53.3% oxygen by mass. Its molar mass is 60 g mol^{-1} . (Atomic masses: $C = 12$, $H = 1$, $O = 16$.) The molecular formula of the compound is

- (A) CH_2O
- (B) $C_2H_4O_2$
- (C) C_3H_8O
- (D) C_2H_6O

Q2. For the hydrogen atom, the energy of the n^{th} level is $E_n = -\frac{13.6}{n^2} \text{ eV}$. The energy released when an electron makes a transition from $n = 3$ to $n = 2$ is

- (A) 1.89 eV
- (B) 10.2 eV



(C) 3.40 eV

(D) 12.1 eV

Q3. The elements *Na*, *Mg*, *Al* and *Si* belong to the third period. The correct order of their first ionization enthalpy is

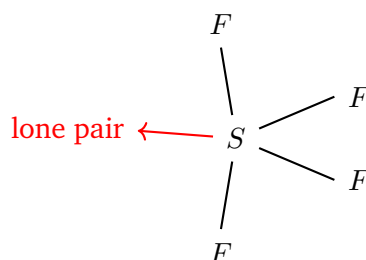
(A) $Na > Mg > Al > Si$

(B) $Si > Al > Mg > Na$

(C) $Si > Mg > Al > Na$

(D) $Na > Al > Mg > Si$

Q4. The molecule SF_4 has one lone pair on the central sulfur atom. Based on VSEPR theory, the hybridization of the central atom and the molecular shape are



(A) sp^3 , tetrahedral

(B) sp^3d^2 , octahedral

(C) sp^3d , trigonal bipyramidal

(D) sp^3d , see-saw

Q5. Given the enthalpies of combustion $\Delta H_C(C, \text{graphite}) = -393.5 \text{ kJ mol}^{-1}$, $\Delta H_C(H_2) = -285.8 \text{ kJ mol}^{-1}$ and $\Delta H_C(CH_4) = -890.3 \text{ kJ mol}^{-1}$, the enthalpy of formation of methane, $C(\text{graphite}) + 2H_2 \rightarrow CH_4$, is

(A) $-211.0 \text{ kJ mol}^{-1}$

(B) $-74.8 \text{ kJ mol}^{-1}$

(C) $+74.8 \text{ kJ mol}^{-1}$



(D) $-1569.6 \text{ kJ mol}^{-1}$

Q6. For the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ at 500 K, the value of K_c is 0.061. Taking $R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$, the relation $K_p = K_c(RT)^{\Delta n_g}$ gives Δn_g equal to

(A) +1

(B) +2

(C) -2

(D) 0

Q7. The oxidation number of chromium in the dichromate ion $Cr_2O_7^{2-}$ is

(A) +6

(B) +7

(C) +3

(D) +12

Q8. A sample of 0.5 mol of an ideal gas occupies a volume of V at a pressure of 2 atm and a temperature of 300 K. Taking $R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$, the volume V is closest to

(A) 24.6 L

(B) 12.3 L

(C) 3.08 L

(D) 6.16 L

Q9. When 1.8 g of glucose ($M = 180 \text{ g mol}^{-1}$) is dissolved in 100 g of water, the depression in freezing point is observed. Taking $K_f = 1.86 \text{ K kg mol}^{-1}$ for water (glucose is a non-electrolyte), the depression in freezing point ΔT_f is

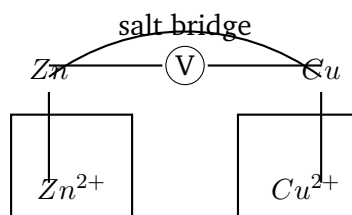
(A) 0.093 K

(B) 0.186 K

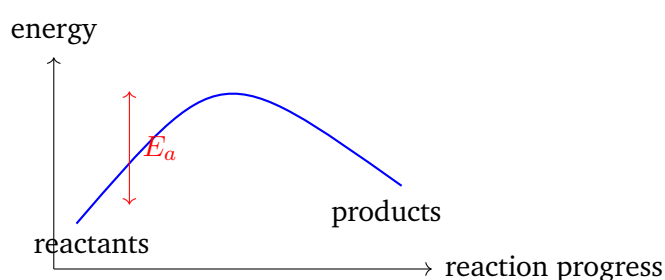


- (C) 1.86 K
(D) 0.372 K

Q10. A galvanic cell is constructed using the half-cells Zn^{2+}/Zn ($E^\circ = -0.76$ V) and Cu^{2+}/Cu ($E^\circ = +0.34$ V), as shown. The standard EMF of the cell ($E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$) is



- (A) +1.10 V
(B) -1.10 V
(C) +0.42 V
(D) -0.42 V
- Q11.** For a reaction, the rate constant doubles when the temperature is raised. Using the Arrhenius equation $k = Ae^{-E_a/RT}$, the term E_a in the exponent represents the



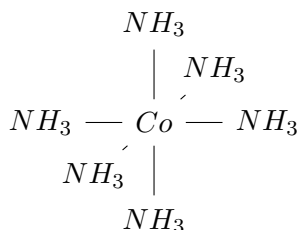
the activation energy. If a reaction has $E_a = 50 \text{ kJ mol}^{-1}$, then increasing the temperature primarily increases the rate by

- (A) decreasing the value of E_a
(B) increasing the value of A only
(C) increasing the fraction of molecules with energy $\geq E_a$
(D) lowering the enthalpy of the products

Q12. The spin-only magnetic moment (in Bohr magnetons) of the Fe^{3+} ion (atomic number of $Fe = 26$) is given by $\mu = \sqrt{n(n+2)}$, where n is the number of unpaired electrons. The value of μ is

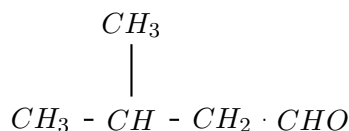
- (A) 2.83 BM
- (B) 4.90 BM
- (C) 3.87 BM
- (D) 5.92 BM

Q13. The complex ion $[Co(NH_3)_6]^{3+}$ (Co atomic number = 27, NH_3 is a strong-field ligand) has the octahedral structure shown. Using valence bond theory, its hybridization and magnetic nature are



- (A) sp^3d^2 , paramagnetic
- (B) d^2sp^3 , diamagnetic
- (C) sp^3d^2 , diamagnetic
- (D) d^2sp^3 , paramagnetic

Q14. The IUPAC name of the organic compound shown below is



- (A) 2-methylbutanal
- (B) butanal
- (C) 3-methylbutanal
- (D) 3-methylbutan-1-ol



- Q15.** When propene ($CH_3 - CH = CH_2$) reacts with HBr in the absence of peroxides, the major product (following Markovnikov's rule) is
- (A) 1-bromopropane
 - (B) 1,2-dibromopropane
 - (C) propan-2-ol
 - (D) 2-bromopropane
- Q16.** Consider the halides: (i) CH_3Br , (ii) CH_3CH_2Br (primary), (iii) $(CH_3)_2CHBr$ (secondary). The correct order of reactivity towards an S_N2 reaction is
- (A) (i) > (ii) > (iii)
 - (B) (iii) > (ii) > (i)
 - (C) (ii) > (i) > (iii)
 - (D) (i) > (iii) > (ii)
- Q17.** Consider the three compounds: phenol, *p*-nitrophenol and *p*-cresol (*p*-methylphenol). The correct order of acidic strength (most acidic first) is
- (A) phenol > *p*-nitrophenol > *p*-cresol
 - (B) *p*-nitrophenol > phenol > *p*-cresol
 - (C) *p*-cresol > phenol > *p*-nitrophenol
 - (D) *p*-nitrophenol > *p*-cresol > phenol
- Q18.** Aldol condensation requires the presence of at least one α -hydrogen atom. Which of the following carbonyl compounds can undergo aldol condensation?
- (A) Benzaldehyde (C_6H_5CHO)
 - (B) Formaldehyde ($HCHO$)
 - (C) Acetaldehyde (CH_3CHO)
 - (D) 2,2-dimethylpropanal ($(CH_3)_3CCHO$)



- Q19.** Consider the following amines in the gas phase: ammonia (NH_3), methylamine (CH_3NH_2) and dimethylamine ($(CH_3)_2NH$). The correct order of basicity (most basic first) is
- (A) $(CH_3)_2NH > CH_3NH_2 > NH_3$
(B) $NH_3 > CH_3NH_2 > (CH_3)_2NH$
(C) $CH_3NH_2 > (CH_3)_2NH > NH_3$
(D) $NH_3 > (CH_3)_2NH > CH_3NH_2$
- Q20.** Among the following carbohydrates, which one is a *non-reducing* sugar (i.e. it does not reduce Tollens' or Fehling's reagent)?
- (A) Glucose
(B) Sucrose
(C) Maltose
(D) Lactose



Detailed Solutions

Q1.

Solution

Concept — Empirical and molecular formula: Convert mass percentages to moles by dividing by atomic mass, take the simplest whole-number ratio to get the empirical formula, then scale up to match the given molar mass.

Step 1 — Mole ratio: $C : \frac{40}{12} = 3.33$; $H : \frac{6.7}{1} = 6.7$; $O : \frac{53.3}{16} = 3.33$. Dividing by the smallest (3.33): $C : H : O = 1 : 2 : 1$.

Step 2 — Empirical formula: CH_2O , empirical mass = $12 + 2 + 16 = 30 \text{ g mol}^{-1}$.

Step 3 — Molecular formula: $\frac{60}{30} = 2$, so multiply subscripts by 2: $C_2H_4O_2$.

Why other options are wrong:

- (A) CH_2O is only the empirical formula (mass 30, not 60).
- (C) C_3H_8O does not match the 1 : 2 : 1 ratio.
- (D) C_2H_6O has the wrong H:O ratio and mass 46.

Final Answer: $C_2H_4O_2 \Rightarrow$ B

Answer: (B) [Go Back to Q1](#)

Q2.

Solution

Concept — Bohr energy levels: Energy released in a transition equals $E_{\text{higher}} - E_{\text{lower}}$ in magnitude, $\Delta E = E_{n_1} - E_{n_2}$ for emission from n_1 to n_2 .

Step 1 — Level energies: $E_3 = -\frac{13.6}{9} = -1.51 \text{ eV}$; $E_2 = -\frac{13.6}{4} = -3.40 \text{ eV}$.

Step 2 — Energy released: $\Delta E = E_3 - E_2 = -1.51 - (-3.40) = 1.89 \text{ eV}$ (emitted as a photon).

Why other options are wrong:

- (B) 10.2 eV is the $n = 2 \rightarrow n = 1$ transition.
- (C) 3.40 eV is just $|E_2|$, not a transition energy.
- (D) 12.1 eV is the $n = 3 \rightarrow n = 1$ transition.

Final Answer: $\Delta E = 1.89 \text{ eV} \Rightarrow$ A

Answer: (A) [Go Back to Q2](#)



Q3.

Solution

Concept — Ionization enthalpy trend: Across a period, first ionization enthalpy generally increases, but anomalies occur where a stable fully/half-filled configuration is disturbed.

Step 1 — Expected trend: Left to right $Na < Mg < Al < Si$ is the naive trend.

Step 2 — Anomaly at Al: $Mg (3s^2)$ has a stable filled s sub-shell, so removing its electron needs more energy than removing the single $3p^1$ electron of Al . Hence $IE(Mg) > IE(Al)$.

Step 3 — Correct order: $Si > Mg > Al > Na$.

Why other options are wrong:

- (A) and (D) wrongly place Na highest.
- (B) ignores the $Mg > Al$ anomaly.

Final Answer: $Si > Mg > Al > Na \Rightarrow$ C

Answer: (C) [Go Back to Q3](#)

Q4.

Solution

Concept — VSEPR and hybridization: Count the steric number = (bond pairs + lone pairs) on the central atom; this fixes the hybridization, and the lone pairs decide the shape.

Step 1 — Steric number of SF_4 : 4 bond pairs + 1 lone pair = 5, so the hybridization is sp^3d (trigonal bipyramidal electron geometry).

Step 2 — Molecular shape: The lone pair occupies an equatorial position (minimizing repulsion), giving a *see-saw* shape rather than a perfect trigonal bipyramid.

Why other options are wrong:

- (A) sp^3 /tetrahedral applies to steric number 4 with no lone pair (e.g. CH_4).
- (B) sp^3d^2 /octahedral is steric number 6 (e.g. SF_6).
- (C) trigonal bipyramidal is the shape only when there is no lone pair (e.g. PCl_5).

Final Answer: sp^3d , see-saw \Rightarrow D



Answer: (D) [Go Back to Q4](#)

Q5.

Solution

Concept — Hess's law: $\Delta H_f(CH_4) = \sum \Delta H_C(\text{reactants}) - \Delta H_C(\text{products})$ for the formation route, equivalently combining combustion equations.

Step 1 — Set up: For $C + 2H_2 \rightarrow CH_4$:

$$\Delta H_f = \Delta H_C(C) + 2\Delta H_C(H_2) - \Delta H_C(CH_4).$$

Step 2 — Substitute:

$$\Delta H_f = (-393.5) + 2(-285.8) - (-890.3) = -393.5 - 571.6 + 890.3 = -74.8 \text{ kJ mol}^{-1}.$$

Why other options are wrong:

- (A) -211.0 uses only one $\Delta H_C(H_2)$ term.
- (C) $+74.8$ has the sign reversed.
- (D) -1569.6 simply adds all three combustion values.

Final Answer: $\Delta H_f = -74.8 \text{ kJ mol}^{-1} \Rightarrow$ B

Answer: (B) [Go Back to Q5](#)

Q6.

Solution

Concept — Relation between K_p and K_c : $K_p = K_c(RT)^{\Delta n_g}$, where $\Delta n_g = (\text{moles of gaseous products}) - (\text{moles of gaseous reactants})$.

Step 1 — Count gas moles: Products = 2 ($2NH_3$); reactants = 1 + 3 = 4 ($N_2 + 3H_2$).

Step 2 — Compute: $\Delta n_g = 2 - 4 = -2$.

Why other options are wrong:

- (A) $+1$ and (B) $+2$ have the wrong sign and magnitude.
- (D) 0 would require equal gas moles on both sides.

Final Answer: $\Delta n_g = -2 \Rightarrow$ C



Answer: (C) [Go Back to Q6](#)

Q7.

Solution

Concept — Oxidation number: The sum of oxidation numbers equals the charge on the ion. Oxygen is usually -2 .

Step 1 — Set up equation: Let the oxidation number of Cr be x . In $Cr_2O_7^{2-}$:
 $2x + 7(-2) = -2$.

Step 2 — Solve: $2x - 14 = -2 \Rightarrow 2x = 12 \Rightarrow x = +6$.

Why other options are wrong:

- (B) $+7$ ignores the -2 ionic charge.
- (C) $+3$ is the oxidation state of Cr in Cr^{3+} salts, not in dichromate.
- (D) $+12$ is the total for both Cr atoms, not per atom.

Final Answer: $+6 \Rightarrow$

Answer: (A) [Go Back to Q7](#)

Q8.

Solution

Concept — Ideal gas equation: $PV = nRT$, so $V = \frac{nRT}{P}$.

Step 1 — Substitute: $n = 0.5$ mol, $R = 0.0821$, $T = 300$ K, $P = 2$ atm.

$$V = \frac{(0.5)(0.0821)(300)}{2} = \frac{12.315}{2} = 6.16 \text{ L.}$$

Why other options are wrong:

- (A) 24.6 L uses $n = 1$ mol and $P = 1$ atm.
- (B) 12.3 L forgets to divide by $P = 2$.
- (C) 3.08 L uses $P = 4$ atm.

Final Answer: $V \approx 6.16$ L \Rightarrow

Answer: (D) [Go Back to Q8](#)



Q9.

Solution

Concept — Depression in freezing point: $\Delta T_f = K_f m$, where m is molality (for a non-electrolyte, van't Hoff factor $i = 1$).

Step 1 — Moles and molality: Moles of glucose = $\frac{1.8}{180} = 0.01$ mol. Mass of water = 0.1 kg, so $m = \frac{0.01}{0.1} = 0.1 \text{ mol kg}^{-1}$.

Step 2 — Compute: $\Delta T_f = K_f m = 1.86 \times 0.1 = 0.186 \text{ K}$.

Why other options are wrong:

- (A) 0.093 K halves the molality (uses 200 g water).
- (C) 1.86 K uses $m = 1 \text{ mol kg}^{-1}$.
- (D) 0.372 K wrongly applies $i = 2$ (glucose does not dissociate).

Final Answer: $\Delta T_f = 0.186 \text{ K} \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q9](#)

Q10.

Solution

Concept — Standard cell EMF: The electrode with higher (more positive) E° is the cathode; $E_{\text{cell}}^\circ = E_{\text{cathode}}^\circ - E_{\text{anode}}^\circ$.

Step 1 — Identify electrodes: Cu^{2+}/Cu (+0.34 V) is the cathode (reduction); Zn^{2+}/Zn (-0.76 V) is the anode (oxidation).

Step 2 — Compute: $E_{\text{cell}}^\circ = 0.34 - (-0.76) = 0.34 + 0.76 = +1.10 \text{ V}$.

Why other options are wrong:

- (B) -1.10 V reverses cathode and anode.
- (C) +0.42 V adds the magnitudes incorrectly (subtracts $0.34 - 0.76$ wrongly handled).
- (D) -0.42 V is a sign and arithmetic error.

Final Answer: $E_{\text{cell}}^\circ = +1.10 \text{ V} \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q10](#)



Q11.

Solution

Concept — Arrhenius / collision picture: The activation energy E_a is the minimum energy barrier (see the energy hump). E_a itself does not change with temperature; raising T increases the fraction of molecules whose energy exceeds the barrier.

Step 1 — Effect of temperature: In $k = Ae^{-E_a/RT}$, increasing T makes the exponential factor $e^{-E_a/RT}$ larger, i.e. a larger fraction of collisions are effective (energy $\geq E_a$).

Step 2 — Interpretation: The barrier E_a and the products' enthalpy are properties of the reaction; they are not altered by temperature. The rate rises because more molecules clear the barrier.

Why other options are wrong:

- (A) E_a is fixed for a given reaction (only a catalyst lowers it).
- (B) A is nearly temperature-independent; the dominant effect is the exponential term.
- (D) Enthalpy of products is a state property, unaffected by T .

Final Answer: Increasing the fraction of molecules with energy $\geq E_a \Rightarrow$ **C**

Answer: (C) [Go Back to Q11](#)

Q12.

Solution

Concept — Spin-only magnetic moment: First find the d -electron configuration of the ion, count unpaired electrons n , then use $\mu = \sqrt{n(n+2)}$ BM.

Step 1 — Configuration of Fe^{3+} : Fe ($Z = 26$) is $[Ar]3d^64s^2$; Fe^{3+} loses three electrons ($4s^2$ and one $3d$) to give $[Ar]3d^5$.

Step 2 — Unpaired electrons: $3d^5$ has all five electrons unpaired, so $n = 5$.

Step 3 — Magnetic moment: $\mu = \sqrt{5(5+2)} = \sqrt{35} = 5.92$ BM.

Why other options are wrong:

- (A) 2.83 BM is for $n = 2$.
- (B) 4.90 BM is for $n = 4$.
- (C) 3.87 BM is for $n = 3$.



Final Answer: $\mu = 5.92 \text{ BM} \Rightarrow$ D

Answer: (D) [Go Back to Q12](#)

Q13.

Solution

Concept — Valence bond theory of octahedral complexes: With a strong-field ligand, d electrons pair up to free inner d orbitals, giving d^2sp^3 (inner-orbital) hybridization.

Step 1 — Oxidation state and configuration: In $[Co(NH_3)_6]^{3+}$, Co is $+3$. Co^{3+} is $[Ar]3d^6$.

Step 2 — Strong field pairing: NH_3 is a strong-field ligand, so the six $3d^6$ electrons pair into three d orbitals, leaving two empty inner $3d$ orbitals. With no unpaired electrons, the complex is *diamagnetic*.

Step 3 — Hybridization: Two inner $3d$ + one $4s$ + three $4p$ orbitals give d^2sp^3 hybridization (octahedral, inner-orbital complex).

Why other options are wrong:

- (A) sp^3d^2 uses outer d orbitals (only with weak-field ligands here).
- (C) sp^3d^2 is outer-orbital; not formed with strong-field NH_3 .
- (D) A $d^2sp^3 Co^{3+}$ complex has all electrons paired, so it cannot be paramagnetic.

Final Answer: d^2sp^3 , diamagnetic \Rightarrow B

Answer: (B) [Go Back to Q13](#)

Q14.

Solution

Concept — IUPAC naming of aldehydes: The $-CHO$ carbon is C-1; choose the longest chain containing it, number from the $-CHO$ end, and name substituents with locants.

Step 1 — Identify the chain: The structure is $CH_3 - CH(CH_3) - CH_2 - CHO$. The longest chain through $-CHO$ has four carbons: butanal.

Step 2 — Number and locate substituent: Numbering from $-CHO$: C-1 (CHO), C-2 (CH_2), C-3 (CH bearing the CH_3 branch), C-4 (CH_3). The methyl



is at C-3.

Step 3 — Assemble name: 3-methylbutanal.

Why other options are wrong:

- (A) 2-methylbutanal numbers from the wrong end.
- (B) butanal omits the methyl substituent.
- (D) names it as an alcohol; the functional group is $-CHO$ (aldehyde).

Final Answer: 3-methylbutanal \Rightarrow

[Go Back to Q14](#)

Q15.

Solution

Concept — Markovnikov's rule: In the ionic addition of HX to an unsymmetrical alkene, the H adds to the doubly bonded carbon bearing more hydrogens, so X goes to the more substituted carbon (via the more stable carbocation).

Step 1 — Protonation: $CH_3 - CH = CH_2 + H^+$ gives the secondary carbocation $CH_3 - \overset{+}{C}H - CH_3$ (more stable than the primary cation).

Step 2 — Bromide attack: Br^- adds to C-2, giving $CH_3 - CHBr - CH_3$, i.e. 2-bromopropane.

Why other options are wrong:

- (A) 1-bromopropane is the anti-Markovnikov product (peroxide effect, not applicable here).
- (B) 1,2-dibromopropane needs Br_2 , not HBr .
- (C) propan-2-ol would require water, not HBr .

Final Answer: 2-bromopropane \Rightarrow

[Go Back to Q15](#)



Q16.

Solution

Concept — S_N2 reactivity: S_N2 proceeds by backside attack in a single step; steric crowding at the carbon slows it. Hence reactivity is methyl > primary > secondary > tertiary.

Step 1 — Rank by steric hindrance: CH_3Br (least hindered) > CH_3CH_2Br (primary) > $(CH_3)_2CHBr$ (secondary, more crowded).

Step 2 — Order: (i) > (ii) > (iii).

Why other options are wrong:

- (B) is the S_N1 order (favoured by more stable carbocations), the reverse for S_N2 .
- (C) and (D) place the substrates out of the steric sequence.

Final Answer: (i) > (ii) > (iii) \Rightarrow

Answer: (A) [Go Back to Q16](#)

Q17.

Solution

Concept — Acidity of substituted phenols: Electron-withdrawing groups (e.g. $-NO_2$) stabilize the phenoxide ion and increase acidity; electron-donating groups (e.g. $-CH_3$) destabilize it and decrease acidity.

Step 1 — Effect of substituents: $-NO_2$ at the para position strongly withdraws electron density (resonance + induction), so *p*-nitrophenol is the most acidic. $-CH_3$ donates electrons, so *p*-cresol is the least acidic. Phenol is intermediate.

Step 2 — Order: *p*-nitrophenol > phenol > *p*-cresol.

Why other options are wrong:

- (A) wrongly ranks phenol above *p*-nitrophenol.
- (C) reverses the trend (puts the electron-donating cresol first).
- (D) wrongly places *p*-cresol above phenol.

Final Answer: *p*-nitrophenol > phenol > *p*-cresol \Rightarrow

Answer: (B) [Go Back to Q17](#)



Q18.

Solution

Concept — Aldol condensation: Only carbonyl compounds with at least one α -hydrogen (a hydrogen on the carbon adjacent to $C = O$) can form the enolate needed for aldol condensation.

Step 1 — Check α -hydrogens: Acetaldehyde CH_3CHO has three α -hydrogens on the CH_3 group, so it readily undergoes aldol condensation.

Step 2 — Eliminate the others: The remaining compounds have no α -hydrogen.

Why other options are wrong:

- (A) Benzaldehyde has no α -H (the carbon next to CHO is aromatic).
- (B) Formaldehyde $HCHO$ has no carbon bearing an α -H.
- (D) 2,2-dimethylpropanal has no α -H (the adjacent carbon is fully substituted by methyls).

Final Answer: Acetaldehyde (CH_3CHO) \Rightarrow C

Answer: (C) [Go Back to Q18](#)

Q19.

Solution

Concept — Basicity of amines (gas phase): In the gas phase, where solvation effects are absent, basicity is governed purely by the electron-donating ($+I$) effect of alkyl groups; more alkyl groups give a more available lone pair.

Step 1 — Inductive effect: Each $-CH_3$ pushes electron density onto nitrogen, increasing the lone pair's availability. So dimethylamine (2 methyls) $>$ methylamine (1 methyl) $>$ ammonia (0 methyls).

Step 2 — Order: $(CH_3)_2NH > CH_3NH_2 > NH_3$.

Why other options are wrong:

- (B) reverses the trend entirely.
- (C) wrongly puts mono- above dimethylamine.
- (D) disorders the methylated amines.

Final Answer: $(CH_3)_2NH > CH_3NH_2 > NH_3 \Rightarrow$ A

Answer: (A) [Go Back to Q19](#)



Q20.

Solution

Concept — Reducing vs non-reducing sugars: A sugar is reducing if it has a free aldehyde/ketone group (a free anomeric carbon) that can be oxidized by Tollens' or Fehling's reagent.

Step 1 — Examine sucrose: In sucrose, the anomeric carbons of glucose and fructose are joined in the glycosidic linkage, leaving *no* free reducing group. Hence sucrose is non-reducing.

Step 2 — The others: Glucose (free $-CHO$), maltose and lactose each retain a free anomeric carbon, so they are reducing sugars.

Why other options are wrong:

- (A) Glucose is a classic reducing monosaccharide.
- (C) Maltose has a free anomeric carbon and is reducing.
- (D) Lactose has a free anomeric carbon and is reducing.

Final Answer: Sucrose \Rightarrow

[Go Back to Q20](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	A	3	C	4	D	5	B
6	C	7	A	8	D	9	B	10	A
11	C	12	D	13	B	14	C	15	D
16	A	17	B	18	C	19	A	20	B

