

GAT B Chemistry

Sample Paper – 4

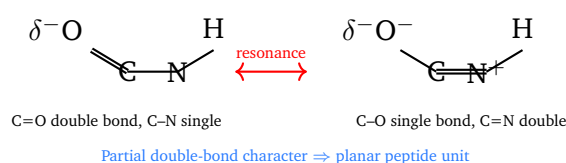
Duration: 23 Minutes

Maximum Marks: 15

Instructions

- This paper contains **15** Multiple Choice Questions (Single Correct Answer), modelled on the Chemistry portion of **GAT B** entrance.
- Each correct answer carries **+1 marks**. There is a **deduction of 0.5 marks for each incorrect answer** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **NCERT Class 11 & 12 Chemistry — Physical, Organic, and Inorganic Chemistry**.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. The peptide bond ($-\text{CO}-\text{NH}-$) in proteins possesses partial double-bond character because of resonance delocalization. The figure below illustrates the two resonance structures. A consequence of this resonance is:



- (A) Restricted rotation about the C–N bond of the peptide unit, making the six atoms of each peptide group coplanar
- (B) Complete free rotation about all bonds in the polypeptide backbone
- (C) Greater flexibility of the protein backbone at physiological pH
- (D) Increased susceptibility of the peptide bond to hydrolysis under neutral conditions



- Q2.** Chargaff's rules state that in double-stranded DNA from any organism:
- (A) $[A] + [T] = [G] + [C]$ (pyrimidines equal purines)
 - (B) $[A] = [G]$ and $[T] = [C]$
 - (C) $[A] = [T]$ and $[G] = [C]$, so the ratio $(A + G)/(T + C) = 1$
 - (D) $[A] + [G] \neq [T] + [C]$ in organisms with high-GC genomes
- Q3.** Phospholipids are the principal lipid components of biological membranes because:
- (A) They are completely insoluble in water and form impermeable monolayers at the cell surface
 - (B) They are amphipathic (possess hydrophilic phosphate-ester head groups and hydrophobic fatty acid tails) and spontaneously form bilayers in aqueous environments
 - (C) Their ester bonds are covalently cross-linked, providing structural rigidity
 - (D) Fully saturated fatty acid chains maximise membrane fluidity at physiological temperature
- Q4.** A buffer solution is prepared from a weak acid HA and its conjugate base A^- (Henderson–Hasselbalch equation: $\text{pH} = \text{p}K_a + \log([A^-]/[HA])$). If the buffer is diluted twofold with pure water, the pH:
- (A) Increases significantly because the acid concentration decreases
 - (B) Decreases significantly because the acid dissociates more on dilution
 - (C) Increases slightly because dilution slightly favours dissociation of HA
 - (D) Remains essentially unchanged because both $[A^-]$ and $[HA]$ are halved equally, leaving the ratio $[A^-]/[HA]$ constant
- Q5.** The dissolution of CaCO_3 is endothermic ($\Delta H_{\text{diss}} > 0$). According to Le Chatelier's principle, increasing the temperature will:
- (A) Increase both the solubility of CaCO_3 and its K_{sp}



- (B) Increase the solubility but leave K_{sp} unchanged (it is a constant)
- (C) Decrease both the solubility and K_{sp}
- (D) Increase K_{sp} but decrease the solubility

Q6. A Carnot heat engine operates between a hot reservoir at 500 K and a cold reservoir at 300 K. The maximum possible efficiency of this engine is:

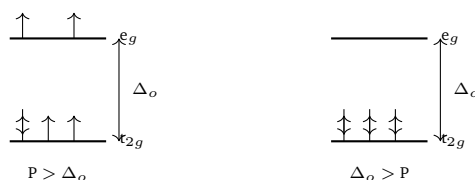
- (A) 50%
- (B) 30%
- (C) 40%
- (D) 60%

Q7. The standard enthalpy of formation, ΔH_f° , of a compound is defined as the enthalpy change when:

- (A) One mole of the compound is completely converted to its constituent elements in their standard states
- (B) One mole of the compound is formed from its constituent elements, each in its standard state, at 298 K and 1 bar pressure
- (C) One mole of the compound undergoes complete combustion in excess oxygen
- (D) One mole of the compound is dissolved in a large excess of water at 298 K

Q8. For a d^6 metal ion in an octahedral crystal field, the diagram below shows the two possible electron configurations. A HIGH-SPIN configuration is favoured when:

High-spin (weak field) Low-spin (strong field)



- (A) The crystal field splitting energy Δ_o exceeds the electron pairing energy P ($\Delta_o > P$)
- (B) Strong-field ligands such as CN^- are present
- (C) The metal is in a high oxidation state (which increases Δ_o)
- (D) The electron pairing energy P exceeds the crystal field splitting energy Δ_o ($P > \Delta_o$), i.e., weak-field ligands are present

Q9. In square planar Pt(II) complexes, the *trans* effect refers to the ability of a ligand to:

- (A) Labilise (enhance the rate of substitution of) the ligand situated in the *trans* position
- (B) Stabilise the ligand in the *cis* position through π back-donation
- (C) Increase the crystal field stabilisation energy of *trans*-positioned ligands
- (D) Form strong π bonds exclusively with *trans*-positioned ligands

Q10. According to Markovnikov's rule, when HBr is added to propene ($\text{CH}_3\text{CH}=\text{CH}_2$), the major organic product is:

- (A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ (1-bromopropane)
- (B) $\text{CH}_3\text{CH}=\text{CHBr}$ (formed by elimination, not addition)
- (C) $\text{CH}_3\text{CHBrCH}_3$ (2-bromopropane)
- (D) $\text{CH}_2\text{BrCH}=\text{CH}_2$ (produced only under anti-Markovnikov, radical conditions)

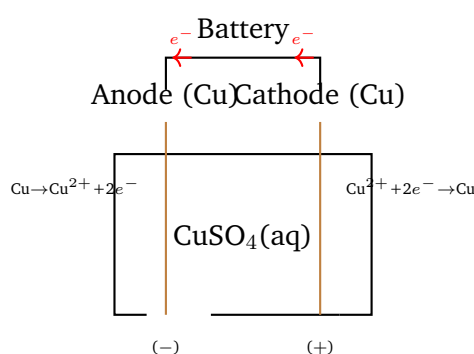
Q11. In Friedel–Crafts acylation of benzene using CH_3COCl and AlCl_3 , the role of AlCl_3 is to:

- (A) Act as a nucleophile and attack the benzene ring directly
- (B) Act as a Lewis acid, abstracting Cl^- from CH_3COCl to generate the electrophilic acylium ion CH_3CO^+



- (C) Act as a Brønsted base to deprotonate the sigma-complex (arenium ion) intermediate
- (D) Increase the electron density of the benzene ring by donating lone pairs

Q12. The diagram below shows an electrolytic cell for CuSO_4 electrolysis. During electrolysis, 96 500 C of charge deposits 108 g of silver ($M = 108 \text{ g mol}^{-1}$, $n = 1$). The mass of copper ($M = 63.5 \text{ g mol}^{-1}$, $n = 2$) deposited by the same charge is:



- (A) 127.0 g
- (B) 63.5 g
- (C) 108 g
- (D) 31.75 g
- Q13.** For the two-step mechanism: $\text{A} \rightarrow \text{B}$ (slow, rate constant k_1) followed by $\text{B} \rightarrow \text{C}$ (fast, rate constant k_2), the overall rate law for the reaction is:
- (A) $\text{Rate} = k_2[\text{B}]$, since the fast step determines the observable concentration of B
- (B) $\text{Rate} = k_1 k_2[\text{A}]$, as both steps contribute
- (C) $\text{Rate} = k_1[\text{A}]$, because the slowest (rate-determining) step controls the overall rate
- (D) $\text{Rate} = (k_1 + k_2)[\text{A}]$, as the rate constants are additive
- Q14.** In the Haber process for synthesis of ammonia ($\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$), iron acts as a heterogeneous catalyst primarily by:



- (A) Adsorbing N_2 and H_2 molecules on its surface, weakening the $\text{N}\equiv\text{N}$ and $\text{H}-\text{H}$ bonds and allowing the surface nitrogen and hydrogen atoms to react at lower activation energy
- (B) Dissolving into the gas mixture to form an iron–nitrogen complex that decomposes to NH_3
- (C) Increasing the temperature of the reaction gas above the thermodynamic optimum
- (D) Participating as a reactant by forming an unstable iron nitride that transfers nitrogen to hydrogen

Q15. Which of the following correctly distinguishes addition polymerization from condensation polymerization?

- (A) Nylon-6,6 is formed by addition polymerization; polyethylene is formed by condensation polymerization
- (B) Polyethylene is formed by addition (chain-growth) polymerization of ethylene with no by-product; Nylon-6,6 is formed by condensation polymerization of hexamethylenediamine and adipic acid, releasing water
- (C) Both polyethylene and Nylon-6,6 are formed by condensation polymerization
- (D) PVC is formed by condensation polymerization; Bakelite is formed by addition polymerization



Detailed Solutions

Q1.

Solution

Concept — Peptide bond and resonance: The carbonyl carbon of a peptide bond can donate electron density toward the nitrogen through $p-\pi$ conjugation, creating a partial $C=N$ character. The result is that the $C-N$ bond has about 40% double-bond character and is shorter and stronger than a typical $C-N$ single bond.

Step 1 — Consequence of partial double-bond character: Because there is significant rotational barrier (due to the π -overlap that would be broken on rotation), the $C-N$ bond of the peptide linkage cannot rotate freely. The six atoms directly involved – C_α , C (carbonyl), O, N, H, C'_α – are locked in a plane (the *peptide plane*).

Step 2 — Why other options are wrong:

- Option B: Free rotation would only occur if there were NO double-bond character; in fact rotation is restricted.
- Option C: Restricted rotation reduces backbone flexibility; it does not increase it.
- Option D: Partial double-bond character actually stabilises the peptide bond against hydrolysis under neutral conditions, not destabilises it.

Final Answer: Restricted rotation $\Rightarrow$ planar peptide unit $\Rightarrow$ A

Answer: (A) [Go Back to Q 1](#)

Q2.

Solution

Concept — Chargaff's rules: Erwin Chargaff (1950) analysed base compositions of DNA from many organisms and found two consistent rules: (i) the amount of adenine equals thymine ($[A] = [T]$), and (ii) the amount of guanine equals cytosine ($[G] = [C]$). These arise from Watson–Crick base pairing in double-stranded DNA.

Step 1 — Verify Option C: $[A] = [T]$ and $[G] = [C]$ imply $[A] + [G] = [T] + [C]$, so $\frac{[A] + [G]}{[T] + [C]} = 1$. This is consistent with Chargaff's second rule (purines = pyrimidines).

Step 2 — Why other options are wrong:

- Option A: $[A] + [T] = [G] + [C]$ would mean



- Option B: $[A] = [G]$ and $[T] = [C]$ would equate a purine with a purine and a pyrimidine with a pyrimidine; this is incorrect.
- Option D: The ratio $(A + G)/(T + C)$ is always 1, even in high-GC organisms.

Final Answer: $[A] = [T]$, $[G] = [C]$, ratio = 1 $\Rightarrow$ C

Answer: (C) [Go Back to Q 2](#)

Q3.

Solution

Concept — Amphipathic nature of phospholipids: A phospholipid molecule has a polar head group (glycerophosphate + charged substituent) and two non-polar hydrocarbon tails. This dual nature is described as *amphipathic* (Greek: both kinds of affinity).

Step 1 — Bilayer formation: In water, the hydrophobic tails avoid the aqueous phase by clustering together, while the hydrophilic heads face the water on both faces. This spontaneous self-assembly produces a bilayer, which is the structural basis of all biological membranes.

Step 2 — Why other options are wrong:

- Option A: Phospholipids are partially soluble (amphipathic, not fully insoluble); they do not form rigid monolayers.
- Option C: Phospholipid bilayers are held together by non-covalent interactions, not covalent cross-links.
- Option D: Saturated tails pack tightly, *reducing* fluidity; unsaturated (kinked) tails increase fluidity.

Final Answer: Amphipathic structure $\Rightarrow$ spontaneous bilayer $\Rightarrow$ B

Answer: (B) [Go Back to Q 3](#)



Q4.

Solution**Concept — Henderson–Hasselbalch equation:**

$$\text{pH} = \text{p}K_a + \log \frac{[\text{A}^-]}{[\text{HA}]}$$

The pH depends only on the *ratio* of the conjugate base to the weak acid, not on their absolute concentrations.

Step 1 — Effect of twofold dilution: If the original concentrations are $[\text{A}^-] = C_b$ and $[\text{HA}] = C_a$, then after dilution both become $C_b/2$ and $C_a/2$, respectively. The ratio:

$$\frac{[\text{A}^-]}{[\text{HA}]} = \frac{C_b/2}{C_a/2} = \frac{C_b}{C_a}$$

is unchanged. Therefore the pH is unchanged.

Step 2 — Why other options are wrong:

- Option A/B: Significant change would occur only if the ratio changed appreciably, which it does not.
- Option C: Although dilution does slightly shift the equilibrium towards dissociation, the Henderson–Hasselbalch analysis shows the effect is negligible for a proper buffer.

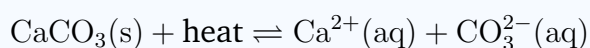
Final Answer: Ratio $[\text{A}^-]/[\text{HA}]$ unchanged $\Rightarrow$ pH unchanged $\Rightarrow$ **D**

Answer: (D) [Go Back to Q 4](#)

Q5.

Solution

Concept — Le Chatelier's principle and K_{sp} : For an endothermic dissolution equilibrium, heat can be considered a reactant:



Increasing temperature supplies more “heat reactant,” shifting the equilibrium to the right.

Step 1 — Effect on solubility: Shifting right means more CaCO_3 dissolves, so solubility increases.

Step 2 — Effect on K_{sp} : K_{sp} is a thermodynamic equilibrium constant that de-



depends on temperature via $\ln K = -\Delta G^\circ/RT$. For an endothermic process, K_{sp} increases with temperature (van't Hoff equation: $d \ln K/dT = \Delta H^\circ/RT^2 > 0$).

Step 3 — Why other options are wrong:

- Option B: K_{sp} is temperature-dependent; it is not a true constant at all temperatures.
- Option C/D: For an endothermic dissolution, both solubility and K_{sp} increase with temperature.

Final Answer: Both solubility and K_{sp} increase $\Rightarrow$ A

Answer: (A) [Go Back to Q 5](#)

Q6.

Solution

Concept — Carnot efficiency: The maximum (Carnot) efficiency of a heat engine is:

$$\eta = 1 - \frac{T_{\text{cold}}}{T_{\text{hot}}}$$

where temperatures must be in Kelvin.

Calculation:

$$\eta = 1 - \frac{300 \text{ K}}{500 \text{ K}} = 1 - 0.60 = 0.40 = 40\%$$

Why other options are wrong:

- Option A (50%): Would require $T_{\text{cold}}/T_{\text{hot}} = 0.50$, e.g., 250 K/500 K.
- Option B (30%): Would require $T_{\text{cold}}/T_{\text{hot}} = 0.70$.
- Option D (60%): This would violate the second law if achieved by any real engine.

Final Answer: $\eta = 40\% \Rightarrow$ C

Answer: (C) [Go Back to Q 6](#)



Q7.

Solution

Concept — Standard enthalpy of formation: ΔH_f° is a defined thermodynamic quantity. The IUPAC definition specifies the formation of *one mole* of compound from its *constituent elements in their standard states* (most stable allotrope at 298 K and 1 bar).

Key criteria:

- (a) Exactly 1 mole of the product compound is formed.
- (b) The reactants are the *elements* (not other compounds).
- (c) Elements are in their *standard states* (e.g., C as graphite, not diamond; O as $O_2(g)$, etc.).
- (d) Conditions: 298 K and 1 bar.

Why other options are wrong:

- Option A: Describes the reverse process (decomposition), which gives $-\Delta H_f^\circ$.
- Option C: Describes standard enthalpy of combustion, ΔH_c° .
- Option D: Describes the enthalpy of solution, ΔH_{soln}° .

Final Answer: Formation from elements in standard states at 298 K, 1 bar $\Rightarrow$ **B**

Answer: (B) [Go Back to Q 7](#)

Q8.

Solution

Concept — Crystal field theory, d^6 octahedral complexes: In an octahedral field, the five d -orbitals split into a lower t_{2g} set (three orbitals) and a higher e_g set (two orbitals), separated by Δ_o .

High-spin vs. low-spin decision: Electrons fill orbitals according to the competition between the crystal field splitting energy (Δ_o) and the electron pairing energy (P):

- If $\Delta_o < P$ (weak-field ligands): electrons avoid pairing by entering the higher e_g level $\Rightarrow$ **high-spin**.
- If $\Delta_o > P$ (strong-field ligands): electrons pair in the lower t_{2g} level $\Rightarrow$ **low-spin**.



d⁶ high-spin configuration: $t_{2g}^4 e_g^2$ (4 unpaired electrons).

Why other options are wrong:

- Option A: $\Delta_o > P$ gives *low-spin*, not high-spin.
- Option B: CN^- is a strong-field ligand (Δ_o large), favouring low-spin.
- Option C: High oxidation state increases Δ_o , favouring low-spin.

Final Answer: $P > \Delta_o$ (weak-field ligands) $\Rightarrow$ high-spin $\Rightarrow$ D

Answer: (D) [Go Back to Q 8](#)

Q9.

Solution

Concept — Trans effect in square planar Pt(II) complexes: Certain ligands exert a kinetic *trans* influence: they accelerate the rate of substitution of the ligand positioned *trans* to them. This is called the trans effect.

Mechanism: Two explanations are invoked:

- σ -donor trans effect:* Strong σ -donor ligands weaken the Pt–L(trans) bond through ground-state weakening.
- π -acceptor trans effect:* π -acceptor ligands stabilise the trigonal-bipyramidal transition state of the substitution.

Trans effect order (partial): $\text{CO} \approx \text{CN}^- \approx \text{C}_2\text{H}_4 > \text{PR}_3 > \text{SCN}^- > \text{NO}_2^- > \text{I}^- > \text{Br}^- > \text{Cl}^- > \text{NH}_3 > \text{OH}^- > \text{H}_2\text{O}$.

Why other options are wrong:

- Option B: The trans effect is a kinetic effect on the trans ligand, not stabilisation of the cis ligand.
- Option C: CFSE is a property of the entire complex, not specifically of trans ligands.
- Option D: π bonding with exclusively trans ligands is not the definition of the trans effect.

Final Answer: Labilises the trans ligand $\Rightarrow$ A

Answer: (A) [Go Back to Q 9](#)



Q10.

Solution

Concept — Markovnikov's rule: When HX adds to an unsymmetrical alkene, the proton (H^+) attaches to the carbon that already has more hydrogen atoms (or more precisely, the more stable carbocation intermediate is formed).

Step 1 — Identify the carbocation: Propene is $\text{CH}_3\text{-CH=CH}_2$. Protonation of C-1 (less substituted) gives the *secondary* carbocation $\text{CH}_3\text{-}\overset{+}{\text{C}}\text{H}\text{-CH}_3$; protonation of C-2 gives the *primary* carbocation $\text{CH}_3\text{-CH=CH}_2\text{H}^+$ at C-1. The secondary carbocation (2°) is more stable.

Step 2 — Product: Br^- attacks the secondary carbocation $\Rightarrow \text{CH}_3\text{CHBrCH}_3$ (2-bromopropane).

Why other options are wrong:

- Option A (1-bromopropane): Anti-Markovnikov product, formed under radical (peroxide) conditions.
- Option B: Elimination, not addition.
- Option D: Anti-Markovnikov product formed via free-radical mechanism (ROOR initiator).

Final Answer: 2-bromopropane (Markovnikov) $\Rightarrow$ C

Answer: (C) [Go Back to Q 10](#)

Q11.

Solution

Concept — Friedel–Crafts acylation mechanism: AlCl_3 is a Lewis acid (electron-pair acceptor). It coordinates to the chlorine of CH_3COCl , pulling the Cl away and generating the highly electrophilic acylium ion.

Step-by-step mechanism:

- (a) $\text{CH}_3\text{COCl} + \text{AlCl}_3 \rightarrow \text{CH}_3\text{CO}^+ + [\text{AlCl}_4]^-$ (acylium ion formation)
(b) CH_3CO^+ attacks benzene ring $\rightarrow$ arenium ion (sigma complex)
 $[\text{AlCl}_4]^-$ removes H^+ from the arenium ion $\rightarrow$ acetophenone + HCl + AlCl_3 (catalyst regenerated)

Why other options are wrong:

- Option A: AlCl_3 is a Lewis *acid*, not a nucleophile.



- Option C: The deprotonation step is performed by $[\text{AlCl}_4]^-$ acting as a weak base, not AlCl_3 itself.
- Option D: AlCl_3 withdraws electron density from the system; it does not donate lone pairs to benzene.

Final Answer: AlCl_3 generates the acylium electrophile $\Rightarrow$ **B**

Answer: (B) [Go Back to Q 11](#)

Q12.

Solution

Concept — Faraday's first and second laws of electrolysis: The mass of substance deposited is:

$$m = \frac{Q \cdot M}{n \cdot F}$$

where Q = charge (C), M = molar mass (g mol^{-1}), n = number of electrons per ion, F = Faraday constant ($96\,500 \text{ C mol}^{-1}$).

Verification with silver:

$$m_{\text{Ag}} = \frac{96500 \times 108}{1 \times 96500} = 108 \text{ g} \quad \checkmark$$

Calculation for copper ($n = 2$):

$$m_{\text{Cu}} = \frac{96500 \times 63.5}{2 \times 96500} = \frac{63.5}{2} = 31.75 \text{ g}$$

Why other options are wrong:

- Option A (127 g): Would require $m = 2 \times 63.5$, i.e., twice the molar mass; incorrect.
- Option B (63.5 g): Ignores the factor of $n = 2$; this would be correct only if Cu were monovalent.
- Option C (108 g): That is the mass of Ag, not Cu.

Final Answer: $m_{\text{Cu}} = 31.75 \text{ g} \Rightarrow$ **D**

Answer: (D) [Go Back to Q 12](#)



Q13.

Solution

Concept — Rate-determining step: In a multi-step reaction, the slowest elementary step is the bottleneck that controls the overall rate. The rate law is written using the concentrations of species involved up to and including the rate-determining step.

Analysis of the mechanism:

- Step 1: $A \xrightarrow{k_1} B$ (slow $\Rightarrow$ rate-determining)
- Step 2: $B \xrightarrow{k_2} C$ (fast)

Because Step 1 is rate-determining, the overall rate is governed entirely by Step 1:

$$\text{Rate} = k_1[A]$$

Why other options are wrong:

- Option A: $\text{Rate} = k_2[B]$ describes only the fast step and cannot be the overall rate expression (B is a reactive intermediate, not a starting material).
- Option B: Rate constants are not simply multiplied together in this way.
- Option D: Rate constants for sequential steps are not additive.

Final Answer: $\text{Rate} = k_1[A] \Rightarrow \boxed{C}$

Answer: (C) [Go Back to Q 13](#)

Q14.

Solution

Concept — Heterogeneous catalysis in the Haber process: Iron (with promoters such as K_2O and Al_2O_3) provides a surface on which N_2 and H_2 are adsorbed, their bonds weakened, and the surface atoms react to form NH_3 at a temperature ($\sim 400\text{--}500^\circ\text{C}$) and pressure ($\sim 150\text{--}300\text{ atm}$) that are commercially viable.

Step-by-step heterogeneous catalytic cycle:

- Adsorption:** $N_2(g)$ and $H_2(g)$ adsorb onto Fe surface sites.
- Dissociation:** $N\equiv N$ and $H-H$ bonds are weakened and cleaved; surface N and H atoms form.
- Reaction:** Surface N atoms combine with surface H atoms step-wise to give NH , NH_2 , then NH_3 .



(d) **Desorption:** $\text{NH}_3(\text{g})$ leaves the surface, regenerating catalyst sites.

Why other options are wrong:

- Option B: Iron does not dissolve into the gas phase; it is a solid heterogeneous catalyst.
- Option C: A catalyst does not change the thermodynamic temperature optimum; it lowers activation energy.
- Option D: Although trace iron nitride may form as an intermediate, iron is regenerated – it is a true catalyst, not a stoichiometric reactant.

Final Answer: Adsorption and bond weakening on Fe surface $\Rightarrow$ A

Answer: (A) [Go Back to Q 14](#)

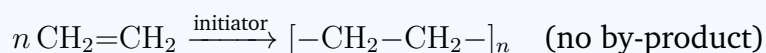
Q15.

Solution

Concept — Addition vs. condensation polymerization:

- **Addition (chain-growth) polymerization:** Monomers contain a double bond (or strained ring). Polymer forms by sequential addition with no small-molecule by-product. Example: ethylene $\rightarrow$ polyethylene.
- **Condensation (step-growth) polymerization:** Monomers contain two or more reactive functional groups (e.g., $-\text{NH}_2$ and $-\text{COOH}$). Polymer forms with expulsion of a small molecule (usually H_2O or HCl). Example: hexamethylenediamine + adipic acid $\rightarrow$ Nylon-6,6 + H_2O .

Verification of Option B:



Why other options are wrong:

- Option A: Reverses the two polymers – completely incorrect.
- Option C: Polyethylene is definitely an addition polymer.
- Option D: PVC (polyvinyl chloride) is an addition polymer (from vinyl chloride monomer); Bakelite is a condensation polymer.

Final Answer: Polyethylene = addition; Nylon-6,6 = condensation $\Rightarrow$ B



Answer: (B) [Go Back to Q 15](#)



Answer Key

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

