

Hydrocarbons — CBSE Pattern Test 2

Class 11 Chemistry · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Chemistry · Hydrocarbons · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

- Alkanes are also called
 - saturated hydrocarbons
 - unsaturated hydrocarbons
 - aromatic hydrocarbons
 - cyclic hydrocarbons
- The reaction of an alkane with chlorine in the presence of sunlight is an example of
 - free radical substitution
 - electrophilic addition
 - nucleophilic substitution
 - elimination
- The hybridisation of the doubly bonded carbon in alkenes is
 - sp^2
 - sp^3
 - sp
 - sp^3d
- The C=C double bond in alkenes consists of
 - one sigma and one pi bond
 - two sigma bonds
 - two pi bonds
 - one sigma bond
- The addition of hydrogen to an alkene in the presence of a catalyst is called
 - hydrogenation
 - halogenation
 - hydration
 - oxidation
- The C≡C triple bond consists of
 - one sigma and two pi bonds
 - three sigma bonds
 - two sigma and one pi bond
 - three pi bonds
- The delocalisation of pi electrons in benzene is responsible for its
 - aromatic stability

- (B) reactivity toward addition
 - (C) acidity
 - (D) basicity
8. The addition of water to an alkene in the presence of an acid gives
- (A) an alcohol
 - (B) an aldehyde
 - (C) a ketone
 - (D) an acid
9. Why are alkanes called saturated hydrocarbons?
10. Why are terminal alkynes acidic in nature?

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. Write the order of reactivity of halogens with alkanes.
12. What are the products of the complete combustion of an alkane?
13. What product is formed by the addition of water to an alkene?
14. Name the type of substitution reaction shown by benzene.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Describe two methods for the preparation of alkanes with chemical equations.
16. Describe two methods for the preparation of alkenes with chemical equations and explain the nature of the double bond.
17. Explain why terminal alkynes are acidic and describe the reactions that demonstrate this acidity.
18. Explain the aromaticity of benzene using Hückel's rule and describe two of its reactions.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Explain the free radical mechanism of the chlorination of methane, showing the initiation, propagation and termination steps.
20. State Markovnikov's rule and explain it using the stability of carbocation intermediates. Predict and justify the product formed when HBr adds to propene.

Answer Key (Marking Scheme)

- Q1 — (A) saturated hydrocarbons. Q2 — (A) free radical substitution. Q3 — (A) sp^2 . Q4 — (A) one sigma and one pi bond.
- Q5 — (A) hydrogenation. Q6 — (A) one sigma and two pi bonds. Q7 — (A) aromatic stability. Q8 — (A) an alcohol.
- Q9 — They contain only single bonds (no unsaturation).
- Q10 — The sp carbon holds the C–H electrons tightly, so H can be released as H^+ .
- Q11 — $F_2 > Cl_2 > Br_2 > I_2$.
- Q12 — Carbon dioxide and water.
- Q13 — An alcohol.
- Q14 — Electrophilic substitution.
- Q15 — Reduction of alkyl halides; hydrogenation of alkenes.

Q16 — Dehydration of alcohols; dehydrohalogenation of alkyl halides; $C=C$ has one sigma and one pi bond.

Q17 — sp carbon; sodium acetylide formation.

Q18 — Hückel's rule; nitration and halogenation.

Q19 — Mechanism as in notes.

Q20 — Markovnikov's rule; product $CH_3-CHBr-CH_3$; secondary carbocation more stable.