CHEMISTRY MCQ BOOKLET

Grade 9 · Chapter 14 · Hydrocarbons

FBISE / National Book Foundation Model Textbook companion

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Independent MCQs on alkanes, hydrogenation, reduction, cracking, halogenation, and combustion. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.

A. Important / Main Topics

1. Hydrocarbons contain only:

(A) carbon and hydrogen
(B) carbon, hydrogen, and oxygen always
(C) nitrogen and sulphur only
(D) metals

Correct Answer: A

Explanation: No other elements in the molecule — so "carbon and hydrogen" is the matching option.

2. Alkanes are:

(A) always alkenes
(B) saturated hydrocarbons with C–C single bonds
(C) always aromatics
(D) always proteins

Correct Answer: B

Explanation: Each carbon has four single bonds — so "saturated hydrocarbons with C–C single bonds" is the matching option.

3. The general formula of open-chain alkanes is:

(A) C_nH_{2n}
(B) C_nH_{2n-2}
(C) C_nH_{2n+2}
(D) $C_n(H_2O)_m$

Correct Answer: C

Explanation: Methane CH_4, ethane C_2H_6, … — so "C_nH_{2n+2}" is the matching option.

4. The simplest alkane is:

(A) ethene
(B) ethyne
(C) benzene
(D) methane, CH_4

Correct Answer: D

Explanation: One carbon, four hydrogens — so "methane, CH_4" is the matching option.

5. Methane is the main component of:

(A) natural gas
(B) distilled water
(C) NPK fertiliser
(D) DNA

Correct Answer: A

Explanation: Pipeline gas is mostly CH_4 — so "natural gas" is the matching option.

6. In methane each carbon–hydrogen link is a:

(A) ionic bond like NaCl
(B) single covalent bond

(C) metallic bond
(D) hydrogen bond only

Correct Answer: B

Explanation: In methane each carbon–hydrogen link is a single covalent bond.

7. Ethane is:

(A) C2H4
(B) C2H2
(C) C2H6 with a C–C single bond
(D) CH3OH

Correct Answer: C

Explanation: The two-carbon alkane — so "C2H6 with a C–C single bond" is the matching option.

8. Hydrogenation means adding:

(A) water as in chlorination
(B) Cl2 in sunlight
(C) CO2 in photosynthesis
(D) H2 across C–C multiple bonds

Correct Answer: D

Explanation: Unsaturated → more saturated — so "H2 across C–C multiple bonds" is the matching option.

9. With finely divided nickel, hydrogenation typically needs:

(A) 200–300 °C and high pressure
(B) room temperature only
(C) liquid nitrogen
(D) no catalyst ever

Correct Answer: A

Explanation: Ni is the hot, high-pressure catalyst — so "200–300 °C and high pressure" is the matching option.

10. Platinum or palladium can hydrogenate alkenes/alkynes at:

(A) only 200–300 °C
(B) room temperature
(C) only 450–750 °C cracking T
(D) absolute zero

Correct Answer: B

Explanation: Pt/Pd are more active than Ni — so "room temperature" is the matching option.

11. Ethyne plus one H2 (Ni) gives:

(A) methane only
(B) benzene
(C) ethene
(D) CO2

Correct Answer: C

Explanation: First π bond saturates to C=C — so "ethene" is the matching option.

12. Ethene plus H2 (Ni) gives:

(A) ethyne
(B) methanol
(C) PVC
(D) ethane

Correct Answer: D

Explanation: C=C + H2 → alkane — so "ethane" is the matching option.

13. Alkynes add two molecules of hydrogen because they have:

(A) two π bonds in the triple bond to saturate
(B) four ionic charges

(C) a benzene ring
(D) peptide links

Correct Answer: A

Explanation: C≡C → C=C → C–C stepwise — so "two π bonds in the triple bond to saturate" is the matching option.

14. Propene + H2 / Ni gives:

(A) propyne
(B) propane
(C) propanol only
(D) CO2

Correct Answer: B

Explanation: The alkene becomes the alkane — so "propane" is the matching option.

15. Propyne + 2 H2 / Ni gives:

(A) propene as the final alkane
(B) methane only
(C) propane
(D) benzene

Correct Answer: C

Explanation: Full saturation of the triple bond — so "propane" is the matching option.

16. Alkyl halides give alkanes when treated with zinc and aqueous acid via:

(A) cracking at 750 °C only
(B) photosynthesis
(C) eutrophication
(D) nascent hydrogen (reduction)

Correct Answer: D

Explanation: Zn/acid liberates [H] — so "nascent hydrogen (reduction)" is the matching option.

17. CH3Cl + 2[H] (Zn/HCl) produces:

(A) CH4 + HCl
(B) C2H4
(C) C2H2
(D) CO2

Correct Answer: A

Explanation: Chloromethane is reduced to methane — so "CH4 + HCl" is the matching option.

18. CH3CH2Cl + 2[H] (Zn/HCl) produces:

(A) ethene
(B) ethane
(C) ethyne
(D) ethanol

Correct Answer: B

Explanation: Chloroethane → ethane — so "ethane" is the matching option.

19. Nascent hydrogen here means:

(A) H2 gas from cracking only
(B) water of crystallisation
(C) atomic hydrogen liberated by Zn + acid
(D) the hydrogen in acids that always stays H+

Correct Answer: C

Explanation: Reactive [H] reduces the C–X bond — so "atomic hydrogen liberated by Zn + acid" is the matching option.

20. Thermal cracking heats large alkanes at about:

(A) 0 °C

(B) 25 °C with Pt only
(C) 100 °C boiling of water
(D) 450–750 °C and high pressure

Correct Answer: D

Explanation: Molecules break into smaller pieces — so "450–750 °C and high pressure" is the matching option.

21. Cracking a large alkane typically yields a mixture of:

(A) smaller alkanes and alkenes
(B) only proteins
(C) only nucleic acids
(D) only noble gases

Correct Answer: A

Explanation: Cracking a large alkane typically yields a mixture of smaller alkanes and alkenes.

22. Decane can crack to octane and:

(A) glucose
(B) ethene
(C) NaCl
(D) O3

Correct Answer: B

Explanation: $C_{10}H_{22} \rightarrow C_8H_{18} + C_2H_4$ — so "ethene" is the matching option.

23. Alkanes are essentially:

(A) ionic salts
(B) always highly polar like water
(C) non-polar
(D) metals

Correct Answer: C

Explanation: Alkanes are essentially non-polar.

24. Alkanes are:

(A) denser and freely miscible like alcohols always
(B) identical to distilled water
(C) always solids at room T
(D) less dense than water and insoluble in it

Correct Answer: D

Explanation: Oil floats; "like dissolves like" fails with water.

25. Hexane is used as a solvent to extract:

(A) vegetable oils from seeds
(B) haemoglobin from blood as the main listed use
(C) DNA only
(D) NPK from urea

Correct Answer: A

Explanation: Non-polar solvent for non-polar oils — so "vege.

26. Alkanes with 1–4 carbons at room temperature are:

(A) always liquids
(B) colourless, odourless gases
(C) always solids
(D) always ionic crystals

Correct Answer: B

Explanation: Methane to butane are gases — so "colourless, odourless gases" is the matching option.

27. Alkanes with about 5–17 carbons are typically:

(A) always gases

(B) always metals
(C) colourless, odourless liquids
(D) always proteins

Correct Answer: C

Explanation: Petrol to heavier liquid fractions — so "colourless, odourless liquids" is the matching option.

28. Higher alkanes with 18 or more carbons are typically:

(A) always hydrogen gases
(B) always alcohols
(C) always DNA
(D) colourless, odourless solids

Correct Answer: D

Explanation: Waxy solids — so "colourless, odourless solids" is the matching option.

29. Alkanes are generally unreactive except for combustion and:

(A) substitution by chlorine (halogenation)
(B) easy addition of bromine water like alkenes
(C) peptide condensation
(D) photosynthesis

Correct Answer: A

Explanation: Alkanes are generally unreactive except for combustion and substitution by chlorine (halogenation).

30. A photochemical reaction occurs in the presence of:

(A) only nickel at 250 °C
(B) sunlight (or other light)
(C) only aqueous Zn
(D) only chlorophyll always

Correct Answer: B

Explanation: A photochemical reaction occurs in the presence of sunlight (or other light).

31. In a substitution reaction, one atom or group is:

(A) always added across a double bond
(B) always cracked off as ethene only
(C) replaced by another
(D) always distilled

Correct Answer: C

Explanation: H of the alkane is replaced by Cl, for example.

32. Methane + Cl_2 in diffused sunlight gives mainly:

(A) only carbon and HCl
(B) only CO_2 and water
(C) ethene
(D) chloromethane and HCl (mono-substitution)

Correct Answer: D

Explanation: $CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$ — so "chloromethane and HCl (mono-substitution)" is the matching option.

33. The chapter limits displayed products of chlorination to:

(A) mono-substitution
(B) only polymers
(C) only esters
(D) only proteins

Correct Answer: A

Explanation: The chapter limits displayed products of chlorination to mono-substitution.

34. Methane + chlorine in direct (strong) sunlight can be:

(A) a gentle mono-substitution only

(B) explosive, giving carbon and HCl
(C) hydrogenation to ethane
(D) cracking to octane

Correct Answer: B

Explanation: Methane + chlorine in direct (strong) sunlight can be explosive, giving carbon and HCl.

35. Combustion is rapid reaction with oxygen producing heat and:

(A) only ice
(B) only peptide bonds
(C) a flame
(D) only N2 from air as the fuel

Correct Answer: C

Explanation: Burning — so "a flame" is the matching option.

36. Complete combustion of alkanes gives:

(A) only CO and soot
(B) only HCl
(C) only NOx
(D) CO2, H2O, and heat

Correct Answer: D

Explanation: Blue flame with plentiful air — so "CO2, H2O, and heat" is the matching option.

37. Complete combustion of methane is:

(A) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
(B) $CH_4 + Cl_2 \rightarrow CH_3Cl$
(C) $C_{10}H_{22} \rightarrow C_8H_{18} + C_2H_4$
(D) $CH_2{=}CH_2 + H_2 \rightarrow C_2H_6$

Correct Answer: A

Explanation: Plenty of oxygen — so "$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$" is the matching option.

38. Most alkanes burn with a:

(A) always sooty yellow flame even in excess air
(B) blue flame when combustion is complete
(C) violet noble-gas glow
(D) no heat

Correct Answer: B

Explanation: Good aeration → blue — so "blue flame when combustion is complete" is the matching option.

39. Lighter alkanes are good fuels because combustion is controllable, they give much heat per gram, and they are:

(A) rare noble gases
(B) always solids
(C) cheap and available
(D) toxic like methanol always

Correct Answer: C

Explanation: Practical fuel reasons — so "cheap and available" is the matching option.

40. Incomplete combustion happens in:

(A) excess oxygen always
(B) pure argon
(C) vacuum
(D) limited oxygen

Correct Answer: D

Explanation: Not enough O2 to make only CO2 — so "limited oxygen" is the matching option.

41. Incomplete methane combustion in the chapter can give CO, carbon (soot), and:

(A) water
(B) only NaCl
(C) only O3
(D) only DNA

Correct Answer: A

Explanation: 3CH4 + 4O2 → 2CO + C + 6H2O — so "water" is the matching option.

42. Alkanes do not readily react with:

(A) oxygen in a flame
(B) ionic reagents under ordinary conditions
(C) chlorine in light
(D) heat in cracking furnaces

Correct Answer: B

Explanation: They are inert to many polar reagents — so "ionic reagents under ordinary conditions" is the matching option.

43. Each carbon in an alkane forms four bonds and each hydrogen forms:

(A) four bonds
(B) three bonds
(C) one bond
(D) zero bonds

Correct Answer: C

Explanation: Each carbon in an alkane forms four bonds and each hydrogen forms one bond.

44. Electron-dot and structural drawings of methane show carbon at the centre with:

(A) a double bond to oxygen
(B) a triple bond
(C) a benzene ring
(D) four hydrogens

Correct Answer: D

Explanation: Tetrahedral connectivity drawn in plane as a cross.

45. Preparation methods listed for alkanes include hydrogenation, reduction of alkyl halides, and:

(A) cracking of larger hydrocarbons
(B) photosynthesis
(C) chlorination of methane only as a prep of alkanes
(D) eutrophication

Correct Answer: A

Explanation: Three general methods in the unit — so "cracking of larger hydrocarbons" is the matching option.

46. Hydrogenation of an alkene is addition; chlorination of an alkane is:

(A) cracking
(B) substitution
(C) distillation
(D) hydration of CuSO4

Correct Answer: B

Explanation: Different reaction classes — so "substitution" is the matching option.

47. Cracking is chemical breaking of large molecules; fractional ideas from earlier organic work separate by boiling — cracking specifically:

(A) only dries CuSO4
(B) only pairs DNA bases
(C) makes smaller hydrocarbons matching fuel/alkene demand
(D) only sets AQI colours

Correct Answer: C

Explanation: Thermal C–C cleavage — so "makes smaller hydrocarbons matching fuel/alkene demand" is the matching option.

48. Because alkanes are unreactive, hexane can serve as a:

(A) strong acid
(B) enzyme
(C) disinfectant like phenol
(D) solvent

Correct Answer: D

Explanation: Because alkanes are unreactive, hexane can serve as a solvent.

49. Gaseous alkanes (C1–C4) are described as colourless and:

(A) odourless (unodorized methane itself)
(B) always smelling like Cl2
(C) always blue
(D) always sour like vinegar

Correct Answer: A

Explanation: Smell in town gas is added separately for safety.

50. A molecule with a C–C single bond among ethane, ethene, ethyne is:

(A) ethene as the only single-bond case
(B) ethane
(C) ethyne
(D) methanol as a hydrocarbon

Correct Answer: B

Explanation: Ethane is the saturated C2 hydrocarbon — so "ethane" is the matching option.

51. Reduction of chloromethane gives:

(A) ethene
(B) ethyne
(C) methane
(D) ethanol

Correct Answer: C

Explanation: Zn/acid [H] replaces Cl by H — so "methane" is the matching option.

52. Combustion of methane produces CO2, water, and:

(A) only HCl
(B) only carbon always even in excess air
(C) only N2
(D) heat (all of those products together)

Correct Answer: D

Explanation: Energy plus oxidation products — so "heat (all of those products together)" is the matching option.

53. Saturated hydrocarbon examples include methane, ethane, and:

(A) propane (or butane)
(B) ethene
(C) ethyne
(D) benzene as an alkane

Correct Answer: A

Explanation: All single C–C bonds — so "propane (or butane)" is the matching option.

54. Pentane as a five-carbon alkane has molecular formula:

(A) C5H10
(B) C5H12
(C) C5H8
(D) C5H5Cl

Correct Answer: B

Explanation: 2n+2 — so "C5H12" is the matching option.

55. To prepare ethane one route is hydrogenation of:

(A) methane
(B) CO2
(C) ethene
(D) N2

Correct Answer: C

Explanation: C2H4 + H2 → C2H6 — so "ethene" is the matching option.

56. Another ethane route is reduction of:

(A) ethyne without extra H2 as the only step to ethane in one equivalent
(B) phenol
(C) acetic acid
(D) chloroethane (ethyl halide)

Correct Answer: D

Explanation: C2H5Cl + 2[H] → C2H6 — so "chloroethane (ethyl halide)" is the matching option.

57. Ethane can also appear among cracking products when a large alkane:

(A) splits into smaller alkanes and alkenes
(B) polymerises to PVC
(C) forms a peptide
(D) dissolves in water as ions

Correct Answer: A

Explanation: Mixture includes light alkanes — so "splits into smaller alkanes and alkenes" is the matching option.

58. Propane can be made by hydrogenating:

(A) only methane
(B) propene or fully hydrogenating propyne
(C) only benzene
(D) only glucose

Correct Answer: B

Explanation: C3 unsaturated + H2 — so "propene or fully hydrogenating propyne" is the matching option.

59. Displayed formula of ethane shows two carbons joined by a:

(A) double bond
(B) triple bond
(C) single bond, each with three hydrogens
(D) ionic link

Correct Answer: C

Explanation: H3C–CH3 — so "single bond, each with three hydrogens" is the matching option.

60. Mono-chlorination product of methane is named:

(A) chloroform as the only product in diffused light here
(B) CCl4 only
(C) vinyl chloride
(D) chloromethane (methyl chloride)

Correct Answer: D

Explanation: CH3Cl — so "chloromethane (methyl chloride)" is the matching option.

61. Direct sunlight with excess chlorine on methane yields solid:

(A) carbon
(B) polyethene
(C) ice
(D) CuSO4

Correct Answer: A

Explanation: Direct sunlight with excess chlorine on methane yields solid carbon.

62. Heat released per gram is a reason alkanes are:

(A) good fertilisers
(B) useful fuels
(C) DNA templates
(D) AQI sensors

Correct Answer: B

Explanation: Energy density plus control and cost — so "useful fuels" is the matching option.

63. Limited air on a methane flame risks toxic:

(A) argon
(B) helium
(C) carbon monoxide
(D) nitrogen as the toxic gas

Correct Answer: C

Explanation: Incomplete combustion — so "carbon monoxide" is the matching option.

64. Soot from incomplete combustion is:

(A) NaCl
(B) glucose
(C) urea
(D) elemental carbon

Correct Answer: D

Explanation: Soot from incomplete combustion is elemental carbon.

65. Alkanes are less dense than water so an oil film:

(A) floats
(B) always sinks
(C) always dissolves completely
(D) always ionises to H+

Correct Answer: A

Explanation: Physical property — so "floats" is the matching option.

66. Insolubility in water follows from alkanes being:

(A) strongly hydrogen-bonded like alcohols always
(B) non-polar
(C) ionic
(D) metallic

Correct Answer: B

Explanation: Water is polar — so "non-polar" is the matching option.

67. High pressure with Ni is needed because hydrogenation of the π bond is:

(A) an acid–base ionisation
(B) a photochemical chlorination
(C) a catalytic addition that is slow without heat/pressure on Ni
(D) a distillation

Correct Answer: C

Explanation: Catalyst + conditions — so "a catalytic addition that is slow without heat/pressure on Ni" is the matching option.

68. Zn does not stay in the organic product; it generates:

(A) the alkyl chain itself
(B) the halogen product as the fuel
(C) ozone

(D) [H] from the acid

Correct Answer: D

Explanation: Metal + acid reductant system — so "[H] from the acid" is the matching option.

69. Aqueous acid in the reduction can be HCl or:

(A) acetic acid (as named)
(B) only concentrated H2SO4 as the only option in the first sentence
(C) only HNO3 from acid rain
(D) only HClO from chlorination of water

Correct Answer: A

Explanation: Zn/HCl or Zn/CH3COOH — so "acetic acid (as named)" is the matching option.

70. CH3CHClCH3 + 2[H] gives:

(A) propene as the saturated product
(B) propane
(C) propyne
(D) propanone

Correct Answer: B

Explanation: CH3CHClCH3 + 2[H] gives propane.

71. Cracking of C10H22 to C8H18 + C2H4 conserves:

(A) only oxygen atoms
(B) only nitrogen
(C) atoms (C and H counts)
(D) only sulphur

Correct Answer: C

Explanation: Balance the hydrocarbon equation — so "atoms (C and H counts)" is the matching option.

72. Alkenes from cracking are useful because they can be:

(A) drunk as mineral water
(B) used as NPK
(C) used as DNA
(D) hydrogenated to alkanes or used as petrochemicals

Correct Answer: D

Explanation: Unsaturation is a handle for more chemistry.

73. The chapter's key point: alkanes are generally:

(A) unreactive
(B) as reactive as alkenes toward bromine water under the same mild conditions
(C) ionic
(D) radioactive

Correct Answer: A

Explanation: Saturation means no easy addition — so "unreactive" is the matching option.

74. Hydrogenation is defined as adding hydrogen to an:

(A) already saturated methane with no multiple bond
(B) unsaturated hydrocarbon
(C) noble gas
(D) salt like NaCl

Correct Answer: B

Explanation: Alkenes and alkynes — so "unsaturated hydrocarbon" is the matching option.

75. Substitution in this unit is illustrated by halogen replacing:

(A) the whole carbon skeleton by oxygen
(B) nitrogen in air
(C) hydrogen of an alkane

(D) the catalyst Ni

Correct Answer: C

Explanation: C–H → C–Cl — so "hydrogen of an alkane" is the matching option.

76. Complete combustion needs a:

(A) limited oxygen supply
(B) chlorine atmosphere
(C) vacuum
(D) plentiful oxygen supply

Correct Answer: D

Explanation: Otherwise CO/soot appear — so "plentiful oxygen supply" is the matching option.

77. Structural formula of methane is often drawn as C at the centre with H at:

(A) four corners of a cross (2D sketch of tetrahedral)
(B) two corners only
(C) a hexagon
(D) a peptide chain

Correct Answer: A

Explanation: Displayed formula — so "four corners of a cross (2D sketch of tetrahedral)" is the matching option.

78. Ethane's condensed formula is:

(A) CH2=CH2
(B) CH3CH3
(C) HC≡CH
(D) CH3OH

Correct Answer: B

Explanation: Two methyl groups joined — so "CH3CH3" is the matching option.

79. Natural gas combustion in excess air should be written toward:

(A) only C(s)
(B) only CH3Cl
(C) CO2 and H2O
(D) only C2H4

Correct Answer: C

Explanation: Complete oxidation of methane — so "CO2 and H2O" is the matching option.

80. Because cracking uses high T and P, it is a:

(A) photochemical chlorination
(B) room-temperature Pt hydrogenation only
(C) water-purity boiling-point test
(D) thermal process breaking C–C bonds

Correct Answer: D

Explanation: Thermal cracking definition — so "thermal process breaking C–C bonds" is the matching option.

B. Less Important / Secondary Topics

81. Valency reminder: carbon in alkanes always shows:

(A) four bonds
(B) two bonds like oxygen in water always
(C) three bonds like nitrogen in ammonia always
(D) one bond like hydrogen

Correct Answer: A

Explanation: Tetravalency — so "four bonds" is the matching option.

82. A dot-and-cross diagram of methane emphasises:

(A) ionic transfer of four electrons to make C4+

(B) shared electron pairs in C–H bonds
(C) metallic delocalisation
(D) hydrogen bonds between molecules as the structure of the molecule

Correct Answer: B

Explanation: Covalent sharing — so "shared electron pairs in C–H bonds" is the matching option.

83. "Finely divided" nickel increases:

(A) the number of carbons in methane
(B) the pH of rain
(C) surface area for catalysis
(D) AQI

Correct Answer: C

Explanation: More surface, faster hydrogenation — so "surface area for catalysis" is the matching option.

84. Room-temperature hydrogenation with Pt/Pd is gentler than Ni because those metals are:

(A) not catalysts
(B) consumed as stoichiometric oxidants
(C) photochemical only
(D) more active catalysts

Correct Answer: D

Explanation: Room-temperature hydrogenation with Pt/Pd is gentler than Ni because those metals are more active catalysts.

85. Why two H2 for an alkyne: after the first addition you still have:

(A) an alkene that can add a second H2
(B) an alkane already
(C) a carboxylic acid
(D) a carbohydrate

Correct Answer: A

Explanation: Two-step saturation — so "an alkene that can add a second H2" is the matching option.

86. [H] in square brackets signals:

(A) a halogen
(B) nascent/atomic hydrogen, not bottled H2 gas alone
(C) helium
(D) a methyl group

Correct Answer: B

Explanation: Reduction notation — so "nascent/atomic hydrogen, not bottled H2 gas alone" is the matching option.

87. Using H2SO4(aq) with Zn in exercise 14.2 still aims to produce:

(A) ethene by cracking
(B) ozone
(C) nascent hydrogen for reduction
(D) glucose

Correct Answer: C

Explanation: Same reduction idea, different acid — so "nascent hydrogen for reduction" is the matching option.

88. Decane is a liquid alkane that can be cracked; octane is:

(A) a gas like methane always
(B) a protein
(C) a nucleic acid
(D) a smaller liquid alkane fragment

Correct Answer: D

Explanation: C8 vs C10 — so "a smaller liquid alkane fragment" is the matching option.

89. Ethene from cracking is an:

(A) alkene (unsaturated)
(B) alkane
(C) alcohol
(D) amine

Correct Answer: A

Explanation: C2H4 — so "alkene (unsaturated)" is the matching option.

90. "Colourless and odourless" for many alkanes means leaks of pure methane are:

(A) always visible as brown NO2
(B) hard to notice by smell
(C) always blue flames without ignition
(D) always sour

Correct Answer: B

Explanation: Safety implication — so "hard to notice by smell" is the matching option.

91. Corn, soybean, and cottonseed oils are extracted with hexane because they are:

(A) ionic like NaCl
(B) identical to water
(C) non-polar like the solvent
(D) proteins only

Correct Answer: C

Explanation: Solubility match — so "non-polar like the solvent" is the matching option.

92. Ionic substances do not easily attack alkanes because alkanes lack:

(A) C–H bonds
(B) carbon atoms
(C) the possibility of combustion
(D) polar bonds/sites for ionic reagents

Correct Answer: D

Explanation: Low polarity — so "polar bonds/sites for ionic reagents" is the matching option.

93. Diffused sunlight is specified for mono-chlorination to avoid:

(A) the explosive carbon-forming reaction of direct sun
(B) all reaction
(C) hydrogenation
(D) cracking

Correct Answer: A

Explanation: Light intensity matters — so "the explosive carbon-forming reaction of direct sun" is the matching option.

94. HCl is the inorganic co-product of methane chlorination in:

(A) complete combustion
(B) diffused sunlight substitution
(C) Ni hydrogenation
(D) Zn reduction of alkyl halides as the organic product

Correct Answer: B

Explanation: CH3Cl + HCl — so "diffused sunlight substitution" is the matching option.

95. A blue flame indicates:

(A) only soot
(B) only CO without CO2 ever
(C) more complete combustion
(D) a photochemical chlorination

Correct Answer: C

Explanation: Good mixing with air — so "more complete combustion" is the matching option.

96. Controllable combustion means you can:

(A) never put out a methane fire
(B) only explode methane in direct sun with Cl2 as cooking
(C) use alkanes as fertilisers
(D) meter fuel and air safely

Correct Answer: D

Explanation: Stoves and engines — so "meter fuel and air safely" is the matching option.

97. Cheap availability of light alkanes refers to:

(A) fossil natural gas and petroleum fractions
(B) laboratory synthesis of every CH4 from CO2 in the kitchen
(C) DNA extraction
(D) CuSO4 hydration

Correct Answer: A

Explanation: Industry supply — so "fossil natural gas and petroleum fractions" is the matching option.

98. The incomplete-combustion equation uses 3 CH4 and 4 O2 to show both:

(A) only CO2
(B) CO and C together with water
(C) only CH3Cl
(D) only C2H6

Correct Answer: B

Explanation: Mixed carbon oxidation states — so "CO and C together with water" is the matching option.

99. Key-point wording: hydrocarbons contain carbon and hydrogen:

(A) and always oxygen
(B) and always nitrogen
(C) only
(D) and always sulphur

Correct Answer: C

Explanation: Definition — so "only" is the matching option.

100. Methane is the simplest:

(A) protein
(B) carbohydrate polymer
(C) nucleic acid
(D) hydrocarbon

Correct Answer: D

Explanation: CH4 — so "hydrocarbon" is the matching option.

101. A think-tank task to write equations for preparing propane could use:

(A) hydrogenation of C3 alkene/alkyne or reduction of a C3 alkyl halide
(B) only photosynthesis
(C) only chlorination of methane
(D) only boiling water

Correct Answer: A

Explanation: Same three methods, C3 target — so "hydrogenation of C3 alkene/alkyne or reduction of a C3 alkyl halide" is the matching option.

102. Displayed formulae in exams should show every:

(A) noble-gas electron
(B) bond to H for the required structure
(C) NPK atom
(D) AQI colour

Correct Answer: B

Explanation: Structural vs condensed — so "bond to H for the required structure" is the matching option.

103. High pressure in cracking helps:

(A) hydrate CuSO4
(B) pair A–T in DNA
(C) break large molecules in the industrial process described
(D) raise pH of acid rain

Correct Answer: C

Explanation: Process condition — so "break large molecules in the industrial process described" is the matching option.

104. Alkanes as solvents work when the solute is:

(A) always ionic
(B) always a protein enzyme
(C) always DNA
(D) also non-polar (oils)

Correct Answer: D

Explanation: Like dissolves like — so "also non-polar (oils)" is the matching option.

105. Mono-substitution means the organic product still has:

(A) three C–H bonds left on the carbon of CH3Cl
(B) no hydrogen left (CCl4 only)
(C) a double bond required
(D) a carboxyl group

Correct Answer: A

Explanation: Only one H replaced — so "three C–H bonds left on the carbon of CH3Cl" is the matching option.

106. Ethyne hydrogenation can be stopped conceptually at ethene or pushed to:

(A) methane by losing a carbon
(B) ethane with extra H2
(C) benzene
(D) glucose

Correct Answer: B

Explanation: Stoichiometry of H2 — so "ethane with extra H2" is the matching option.

107. Zn/HCl reduction replaces halogen with hydrogen, so the carbon count:

(A) always drops by two
(B) always rises to decane
(C) stays the same as the alkyl halide
(D) becomes zero

Correct Answer: C

Explanation: C–X → C–H — so "stays the same as the alkyl halide" is the matching option.

108. Review trap: methanol is not a hydrocarbon because it contains:

(A) only C and H
(B) a C–C triple bond as the definition of alcohol
(C) a metal
(D) oxygen

Correct Answer: D

Explanation: CH3OH is an alcohol — so "oxygen" is the matching option.