Indian School Muscat
Chemistry IIT - JEE
HYDROCARBONS

1. Among the following compounds the one that is most reactive towards electrophilic nitration is
   A. Toluene
   B. Benzene
   C. Benzoic Acid
   D. Nitrobenzene
2. Which branched chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of mono substituted alkyl halide?
   A. Tertiary butyl chloride
   B. Neopentane
   C. Isohexane
   D. Neohexane
3. Ethyl benzene cannot be prepared by _____.
   A. Clemmensen reduction
   B. Wurtz reaction
   C. Wurtz-Fittig reaction
   D. Friedel-Crafts reaction
4. Ozonolysis of an organic compound 'A' produces acetone and propionaldehyde in equimolar mixture. Identify 'A' from the following compounds
   A. 1 – Pentene
   B. 2 - Methyl - 1 - pentene
   C. 2 - Methyl - 2 - pentene
   D. 2 - Pentene
5. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of
   A. A vinyl group
   B. Two ethylenic double bonds
   C. An acetylenic triple bond
   D. An isopropyl group
6. A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is _____.
   A. 2, 2-dibromobutane
   B. 1, 1-dibromopropane
   C. 1, 4-dibromobutane
   D. 1, 2-dibromoethane

7. Which one of these is NOT TRUE for benzene?
   A. Heat of hydrogenation of benzene is less than the theoretical value
   B. There are three carbon-carbon single bonds and three carbon-carbon doub
   C. It forms only one type of monosubstituted product
   D. The bond angle between carbon-carbon bonds is 120°
8. The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alkyne. The bromoalkane and alkyne respectively are

   A. $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$
   B. $BrCH_2CH_2CH_3$ and $CH_3CH_2CH_2C \equiv CH$
   C. $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3C \equiv CH$
   D. $BrCH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$
9. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is
   A. Ethane
   B. Propene
   C. 1-butene
   D. 2-butene
10. n-propyl bromide on treating with alcoholic KOH produces
   A. Propyne
   B. Propene
   C. Propane
   D. propanol
11. In the following sequence of reactions, the alkene affords the compound 'B'

   $CH_3CH = CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$

   The compound B is

   A. CH_3CH_2CHO
   B. CH_3COCH_3
   C. $CH_3CH_2COCH_3$
   D. CH_3CHO
12. The hydrocarbon which can react with sodium in liquid ammonia is
   A. $CH_3CH_2CH_2C{\equiv}CCH_2CH_2CH_3$
   B. $CH_3CH_2C{\equiv}CH$
   C. $CH_3CH{=}CHCH_3$
   D. $CH_3CH_2C{\equiv}CCH_2CH_3$
13. Benzene reacts with chlorine in sunlight to give a final product

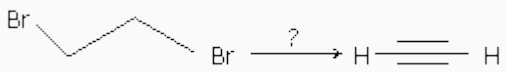
   A. C_6H_5Cl

B. C_6Cl_6
C. $C_6H_6Cl_6$
D. CCl_4

14. The general formula of a cycloalkane is

A. C_nH_{2n+2}
B. C_nH_{2n-2}
C. C_nH_{2n}
D. C_nH_n

15. The reagent(s) for the following conversion,



is/are

A. alcoholic KOH
B. alcoholic KOH followed by $NaNH_2$
C. aqueous KOH followed by $NaNH_2$
D. Zn/CH_3OH

16. Presence of a nitro group in a benzene ring
A. activates the ring towards electrophilic substitution
B. renders the ring basic
C. deactivates the ring towards nucleophilic substitution
D. deactivates the ring towards electrophilic substitution

17. The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is

A. Benzophenone
B. Acetophenone
C. benzoic acid
D. benzyl alcohol

18. Which of the following reactions will yield 2, 2-dibromopropane?

A. $CH_3 - C \equiv CH + 2HBr \rightarrow$
B. $CH_3\ CH \equiv CHBr + HBr \rightarrow$
C. $CH \equiv CH + 2HBr \rightarrow$
D. $CH_3 - CH = CH_2 + HBr \rightarrow$

19. HBr reacts with $CH_2 = CH - OCH_3$ under anhydrous conditions at room temperature to give

A. CH_3CHO and CH_3Br
B. $BrCH_2CHO$ and CH_3OH
C. $BrCH_2 - CH_2 - OCH_3$

D. $H_3C - CHBr - OCH_3$

20. Phenyl magnesium bromide reacts with methanol to give
    A. a mixture of anisole and Mg(OH)Br
    B. a mixture of benzene and Mg(OMe)Br
    C. a mixture of toluene and Mg(OH)Br
    D. a mixture of phenol and Mg(Me)Br
21. A gas decolourised by $KMnO_4$ solution but gives no precipitate with ammoniacal cuprous chloride is
    A. Ethane
    B. Methane
    C. Ethene
    D. Acetylene
22. 2 methylbutane on reacting with bromine in the presence of sunlight gives mainly
    A. 1-bromo 2-methylbutane
    B. 2-bromo 2-methylbutane
    C. 2-bromo 3-methylbutane
    D. 1-bromo 3-methylbutane
23. Alkyl halides react with dialkyl copper reagents to give
    A. alkanes
    B. alkyl copper halides
    C. alkenes
    D. alkenyl halides
24. Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating?
    A. $-C \equiv N$
    B. $-SO_3H$
    C. –COOH
    D. $-NO_2$
25. When 2-butyne is treated with Pd-BaSO4; the product formed will be:
    A. 1-butene
    B. trans-2-butene
    C. cis-2-butene
    D. 2-hydroxy butane
26. Which of the following compounds will not undergo Friedel-Craft's reaction easily?
    A. Cumene
    B. Xylene
    C. Nitrobenzene
    D. Toluene

27. Which of the following has highest knocking?
    A. Straight chain olefins
    B. Branched chain olefins
    C. Olefins
    D. Aromatic hydrocarbons
28. Which of the following reagents when heated with ethyl chloride, forms ethylene?
    A. Alcoholic KOH
    B. Zn/HCl
    C. Aqueous KOH
    D. HI
29. The coal tar fraction which contains phenol is:
    A. Heavy oil
    B. Light oil
    C. Middle oil
    D. Green oil
30. The first fraction obtained during the fractionation of petroleum is:
    Gasoline
    A. Diesel oil
    B. Hydrocarbon gases
    C. Kerosene oil
31. Which one of the following methods is neither meant for the synthesis nor for separation of amines?
    A. Wurtz reaction
    B. Hofmann method
    C. Hinsberg method
    D. Curtius reaction
32. Reaction of one molecule of HBr with one molecule of 1, 3-butadiene at 40°C gives predominantly
    A. 3-bromobutene under kinetically controlled conditions
    B. 1-bromo-2-butene under thermodynamically controlled conditions
    C. 3-bromobutene under thermodynamically controlled conditions
    D. 1-bromo-2-butene under kinetically controlled conditions
33. A petroleum fraction having boiling range 70 - 200°C and containing 6 - 10 carbon atoms per molecule is called
    A. natural gas
    B. gas oil
    C. Gasoline
    D. Kerosene
34. Addition of HBr to propylene in presence of benzoyl peroxide, follows :

A. Carbanion mechanism
B. Baeyer's rule
C. Markownikoff's rule
D. Anti-Markownikoff's rule

35. Aqueous solution of an organic compound, 'A' on electrolysis liberates acetylene and CO_2 at anode. 'A' is
A. potassium citrate
B. potassium succinate
C. potassium acetate
D. potassium maleate

36. Cetane is a compound which has very good ignition property. Chemically it is
A. $C_{17}H_{34}$
B. $(CH_3)_3C(CH_2)_{11}CH_3$
C. $CH_3(CH_2)_{14}CH_3$
D. None of these

37. Compound which gives acetone on ozonolysis :
A. $C_6H_5CH = CH_2$
B. $(CH_3)_2C = C(CH_3)_2$
C. $CH_3 — CH = CH — CH_3$
D. $CH_3CH = CH_2$

38. Correct statement about 1, 3-dibutene :
A. forms polymer
B. reacts with HBr
C. conjugated double bonds are present
D. all of the above

39. Nitrobenzene on reaction with conc. HNO_3/H_2SO_4 at 80 – 100°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

40. Petrol for aviation purpose must contain
A. straight chain hydrocarbons
B. olefinic hydrocarbons
C. aromatic hydrocarbons
D. highly branched chain hydrocarbons

41. Propyne and propene can be distinguished by :
A. alk. $KMnO_4$
B. Br_2 in CCl_4

C. conc. H_2SO_4
D. $AgNO_3$ in NH_3

42. Pure methane can be produced by
A. Soda lime decarboxylation
B. Kolbe's electrolytic method
C. Wurtz reaction
D. Reduction with H_2

43. Methyl iodide is converted into ethane by heating it in ether medium with
A. Al
B. Zn
C. Na
D. Cu

44. By which of the following compounds both CH_4 and C_2H_6 can be prepared in one step?
A. CH_3I
B. CH_3OH
C. C_2H_5I
D. C_2H_5OH

45. For the synthesis of but-1-ene, CH_3MgI should be treated with
A. Propene
B. 2-Chloropropene
C. Allylchloride
D. Ethyl chloride

46. Which of the following reagent when treated with ethyl chloride, forms ethylene?
A. Aqueous KOH
B. Zn/HCl
C. Alcoholic KOH
D. HI

47. When sodium propionate is heated with sodalime, the product formed is
A. Methane
B. Ethane
C. Ethene
D. Ethyne

48. What is one of the products of addition of HBr to but-2-ene?
romobutane
romobutane
dibromobutane
dibromobutane

49. 1- butyne on hydration gives

A. Butyne-1,2-diol
B. Butane-1-ol
C. Butane-2-ol
D. Butane- 2- one

50. The test for unsaturation is confirmed by the decolourisation of which of the following?
A. Iodine water
B. $CuSO_4$ solution
C. Bromine water
D. All of the above