

EXERCISE - I (Conceptual Questions)

Build Up Your Understanding

Alkanes

1. The order of reactivity of alkyl halides in Wurtz reaction is
 (1) $R-I > R-Br > R-Cl$
 (2) $R-I < R-Br < R-Cl$
 (3) $R-Br > R-I < R-Cl$
 (4) $R-I > R-Cl > R-Br$

CHC001

2. Which of the following compound is not suitable to obtain from Wurtz reaction?
 (1) Ethane (2) Butane
 (3) Neopentane (4) Hexane

CHC003

3. Which of the following reactions does not involve a C—C bond formation
 (1) Hydrolysis of a Grignard reagent
 (2) Combination of two alkyl free radicals
 (3) Kolbe electrolysis
 (4) $RNa + R-Br \longrightarrow R-R + NaBr$

CHC007

4. Which of the following reactions of methane is incomplete combustion :-
 (1) $2CH_4 + O_2 \xrightarrow{Cu/523K/100atm.} 2CH_3OH$
 (2) $CH_4 + O_2 \xrightarrow{Mo_2O_3} HCHO + H_2O$
 (3) $CH_4 + O_2 \longrightarrow C(s) + 2H_2O(l)$
 (4) $CH_4 + 2O_2 \longrightarrow CO_2(g) + 2H_2O(l)$

CHC009

5. Pyrolysis of alkanes is a
 (1) Nucleophilic addition reaction
 (2) Free radical substitution reaction
 (3) Electrophilic addition reaction
 (4) Free radical elimination reaction

CHC008

6. $CH_3CH_2CH_2Br \xrightarrow[\Delta]{alc. KOH} A \xrightarrow[(ii) Zn, H_2O]{(i) O_3} B + C$

In the above reaction A, B and C are given by the set

- (1) Propylene, acetone, formaldehyde
 (2) Propene, ethanal, methanal
 (3) Propyne, acetaldehyde, formaldehyde
 (4) Propylene, propionaldehyde, formaldehyde

CHC014

Alkene

7. Ozonolysis of 3-Methyl-1-butene gives a mixture of
 (1) Propanal and ethanal
 (2) Propanone and ethanal
 (3) 2-Methylpropanal and methanal
 (4) Butanone and methanal

CHC010

8. Which alkene gives acetone only on ozonolysis
 (1) Isobutylene
 (2) 2,3-Dimethyl-1-butene
 (3) 2,3-Dimethyl-2-butene
 (4) 3,3-Dimethyl-1-butene

CHC011

9. Oxidation of isobutylene with acid potassium permanganate gives
 (1) Acetone + CO_2
 (2) Acetic acid
 (3) Acetic acid + CO_2
 (4) Acetic acid + acetone

CHC012

10. Which of the following reactions is used for locating the position of double bond in an alkene
 (1) Hydroboration
 (2) Hydroxylation
 (3) Chlorohydroxylation
 (4) Ozonolysis

CHC013

11. Which one of the following has the smallest heat of hydrogenation per mole
 (1) 1-butene (2) Trans-2-butene
 (3) Cis-2-butene (4) Propene

CHC015

12. An alkene "A" contains three C—C, eight C—H σ -bonds and one C—C π -bond. "A" on ozonolysis gives two moles of an aldehyde of molar mass 44. Which of the following is the IUPAC name of A.

- (1) But-1-ene (2) But-2-ene
 (3) Pent-2-ene (4) But-2-yne

CHC016

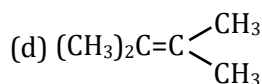
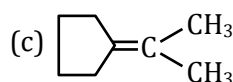
13. The molecules having dipole moment are :-

- (1) 2,2-dimethylpropane
- (2) trans pent-2-ene
- (3) cis-hex-3-ene
- (4) 2 and 3

CHC017

14. Which of the following alkenes on ozonolysis give a mixture of ketones only?

- (a) $\text{CH}_3\text{-CH=CH-CH}_3$
- (b) $\text{CH}_3\text{-CH(CH}_3\text{)-CH=CH}_2$



- (1) a and b
- (2) b and c
- (3) b and d
- (4) c and d

CHC018

Alkynes

15. Kolbe's electrolysis of sodium maleate at anode gives.

- (1) Only acetylene
- (2) Only CO_2
- (3) Acetylene + CO_2
- (4) CO_2 + H_2

CHC019

16. The pH of solution in Kolbe's electrolysis

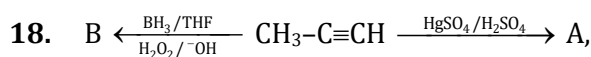
- (1) Increase with time
- (2) Decrease with time
- (3) Remains constant
- (4) Nothing can be said

CHC020

17. Which of the following compound will not give a precipitate with Tollen's reagent

- (1) Ethyne
- (2) 1-butyne
- (3) 3-methyl-1-butyne
- (4) 1-pentene

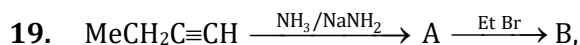
CHC021



A and B are

- (1) $\text{CH}_3\text{CH}_2\text{CHO}$, CH_3COCH_3
- (2) CH_3COCH_3 , $\text{CH}_3\text{CH}_2\text{CHO}$
- (3) CH_3COCH_3 both
- (4) CH_3COCH_3 , $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

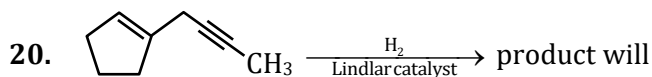
CHC022



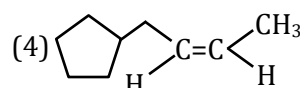
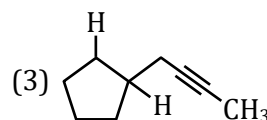
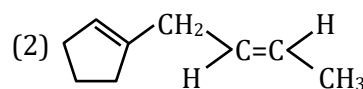
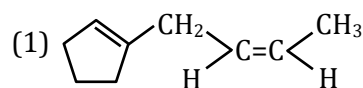
A and B are

- (1) $\text{MeCH}_2\text{C}\equiv\text{CNa}$, $\text{MeCH}_2\text{C}\equiv\text{C-Et}$
- (2) $\text{MeCH}_2\text{CH=CH}_2$, $\text{MeCH}_2\text{-CHEt-CH}_3$
- (3) $\text{MeCH}_2\text{CH=CHNH}_2$, $\text{MeCH}_2\text{CH=CH-NHBr}$
- (4) $\text{MeCH}_2\text{C}\equiv\text{C-NH}_2$, $\text{MeC}\equiv\text{C-NH-Br}$

CHC023



be :



CHC024

21. To distinguish between propene and propyne, the reagent would be -

- (1) Bromine
- (2) Alkaline KMnO_4
- (3) Ammonical silver nitrate
- (4) Ozone

CHC025

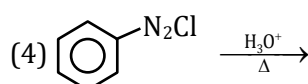
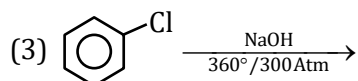
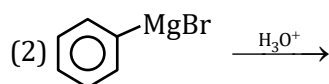
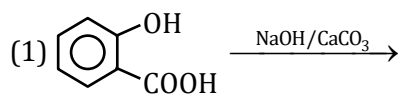
22. When treated with ammonical cuprous chloride, which one among the following forms red precipitate ?

- (1) C_2H_6
- (2) C_2H_4
- (3) C_2H_2
- (4) C_6H_6

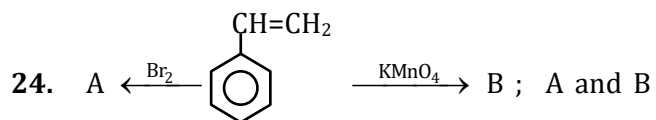
CHC026

Aromatic Hydrocarbons

23. In which of the following reactions benzene is obtained



CHC027



respectively are

- (1) o-bromo styrene, benzoic acid
 (2) p-bromostyrene, benzaldehyde
 (3) m-bromostyrene, benzaldehyde
 (4) Styrene dibromide, benzoic acid.

CHC028

EXERCISE-I (Conceptual Questions)

ANSWER KEY

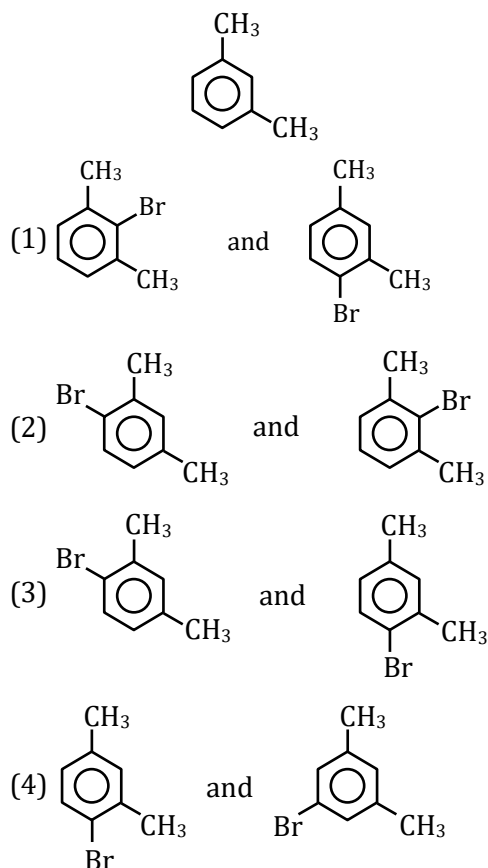
Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	3	1	3	4	2	3	3	1	4	2	2	4	4	3
Question	16	17	18	19	20	21	22	23	24						
Answer	1	4	2	1	1	3	3	2	4						

EXERCISE - II (Previous Year Questions)

AIPMT/NEET

AIPMT 2014

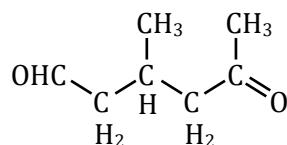
1. What products are formed when the following compound is treated with Br_2 in the presence of FeBr_3 ?



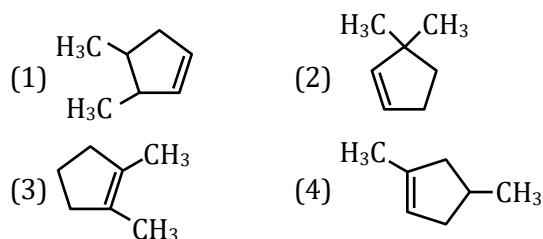
CHC046

AIPMT 2015

2. A single compound of the structure :-

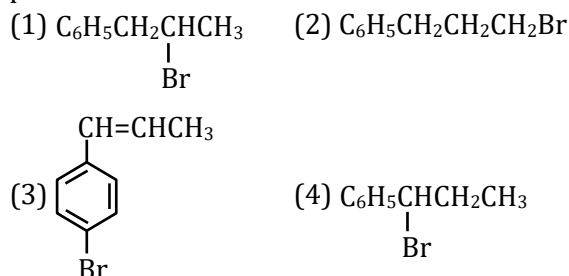


is obtainable from ozonolysis of which of the following cyclic compounds ?



CHC047

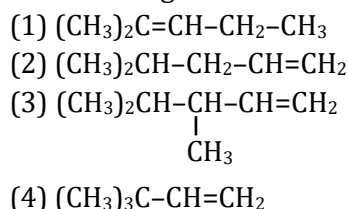
3. The reaction of $\text{C}_6\text{H}_5\text{CH}=\text{CHCH}_3$ with HBr produces:-



CHC048

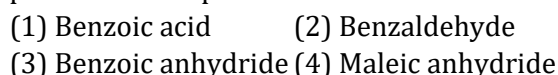
Re-AIPMT 2015

4. 2,3-Dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid ?



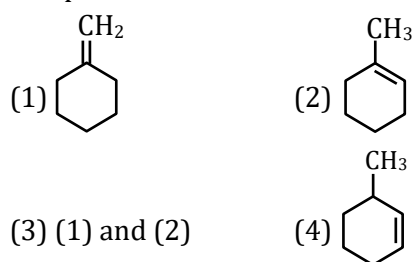
CHC049

5. The oxidation of benzene by V_2O_5 in the presence of air produces :



CHC050

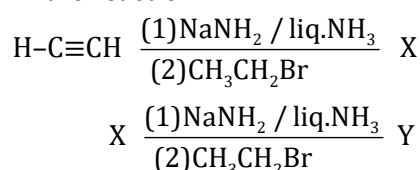
6. In the reaction with HCl , an alkene reacts in accordance with the Markovnikov's rule, to give a product 1-chloro-1 methylcyclohexane. The possible alkene is :-



CHC051

NEET-I 2016

7. In the reaction



X and Y are :

- (1) X = 1-Butyne ; Y = 3-Hexyne
 (2) X = 2-Butyne ; Y = 3-Hexyne
 (3) X = 2-Butyne ; Y = 2-Hexyne
 (4) X = 1-Butyne ; Y = 2-Hexyne

CHC052

8. Consider the nitration of benzene using mixed conc. H_2SO_4 and HNO_3 . If a large amount of KHSO_4 is added to the mixture, the rate of nitration will be:-

- (1) Faster (2) Slower
 (3) Unchanged (4) Doubled

CHC053

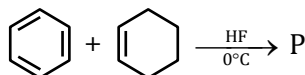
NEET-II 2016

9. Which of the following compounds shall not produced propene by reaction with HBr followed by elimination or direct only by elimination reaction ?

- (1) $\text{H}_2\text{C}=\text{C}=\text{O}$ (2) $\text{H}_3\text{C}-\overset{\text{H}_2}{\text{C}}-\text{CH}_2\text{Br}$
 (3) $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\ \diagup \quad \diagdown \\ \text{C} \\ \diagdown \quad \diagup \\ \text{H}_2 \end{array}$ (4) $\text{H}_3\text{C}-\overset{\text{H}_2}{\text{C}}-\text{CH}_2\text{OH}$

CHC054

10. In the given reaction



the product P is :-

- (1) (2)
 (3) (4)

CHC055

11. The compound that will react most readily with gaseous bromine has the formula

- (1) C_4H_{10} (2) C_2H_4 (3) C_3H_6 (4) C_2H_2

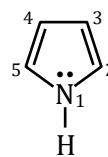
CHC056

12. Which of the following can be used as the halide component for Friedel-Crafts reaction ?

- (1) Chloroethene (2) Isopropyl chloride
 (3) Chlorobenzene (4) Bromobenzene

CHC057

13. In pyrrole



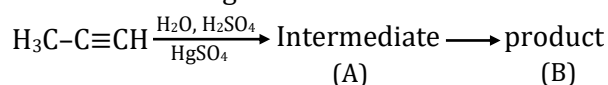
The electron density is maximum on :-

- (1) 2 and 4 (2) 2 and 5
 (3) 2 and 3 (4) 3 and 4

CHC058

NEET(UG) 2017

14. Predict the correct intermediate and product in the following reaction :



- (1) A : $\text{H}_3\text{C}-\overset{\text{OH}}{\text{C}}=\text{CH}_2$ B : $\text{H}_3\text{C}-\overset{\text{SO}_4}{\text{C}}=\text{CH}_2$
 (2) A : $\text{H}_3\text{C}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{CH}_3$ B : $\text{H}_3\text{C}-\text{C}\equiv\text{CH}$
 (3) A : $\text{H}_3\text{C}-\overset{\text{OH}}{\text{C}}=\text{CH}_2$ B : $\text{H}_3\text{C}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{CH}_3$
 (4) A : $\text{H}_3\text{C}-\overset{\text{SO}_4}{\text{C}}=\text{CH}_2$ B : $\text{H}_3\text{C}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{CH}_3$

CHC059

NEET(UG) 2018

15. Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (A) is

- (1) $\text{CH}\equiv\text{CH}$ (2) $\text{CH}_2=\text{CH}_2$
 (3) CH_3-CH_3 (4) CH_4

CHC060

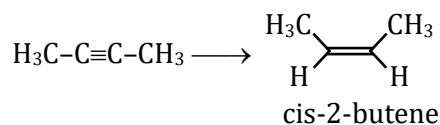
16. Which of the following carbocations is expected to be most stable ?

- (1) (2)
 (3) (4)

CHC061

NEET(UG) 2019

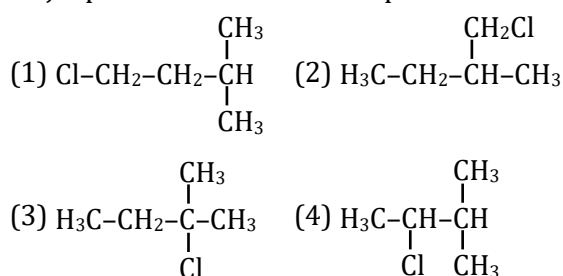
17. The most suitable reagent for the following conversion is :-



- (1) Na/liquid NH_3 (2) H_2 , Pd/C, quinoline
(3) Zn/HCl (4) $\text{Hg}^{2+}/\text{H}^+$, H_2O

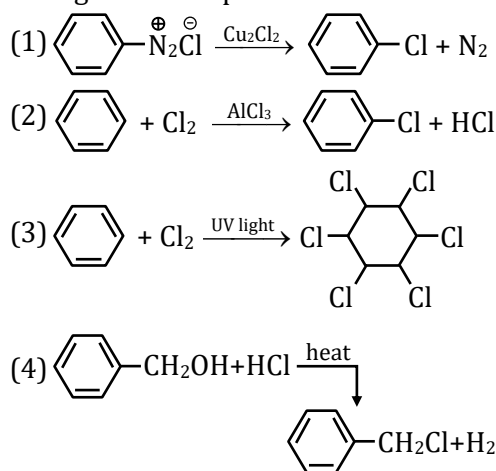
CHC062

18. An alkene "A" on reaction with O_3 and $\text{Zn-H}_2\text{O}$ gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is :-



CHC063

19. Among the following, the reaction that proceeds through an electrophilic substitution is :



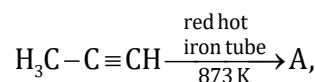
CHC064

NEET(UG) 2019 (ODISHA)

20. The alkane that gives only one mono-chloro product on chlorination with Cl_2 in presence of diffused sunlight is :-
(1) 2,2-dimethylbutane
(2) Neopentane
(3) n-pentane
(4) Isopentane

CHC065

21. In the following reaction,



the number of sigma(σ) bonds present in the product A is :-

- (1) 21 (2) 9 (3) 24 (4) 18

CHC066

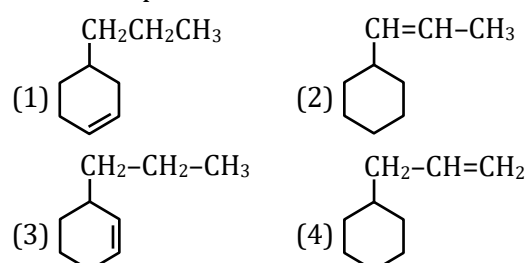
NEET(UG) 2020

22. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

- (1) n-Butane (2) n-Hexane
(3) 2,3-Dimethylbutane (4) n-Heptane

CHC067

23. An alkene on ozonolysis gives methanal as one of the product. Its structure is :



CHC069

NEET(UG) 2020 (COVID-19)

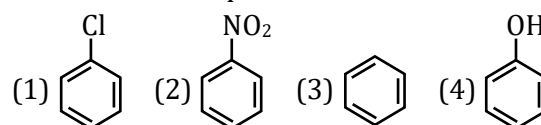
24. $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 \xrightarrow[\text{H}_2\text{O}_2, \text{OH}^-]{\text{B}_2\text{H}_6} \text{Z}$

What is Z ?

- (1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
(2) $\text{CH}_3\text{CH}_2\underset{\text{OH}}{\text{CH}}\text{CH}_3$
(3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$
(4) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

CHC070

25. Which of the following compound is most reactive in electrophilic aromatic substitution?



CHC071

26. Which of the following is a free radical substitution reaction ?

- (1) Benzene with $\text{Br}_2/\text{AlCl}_3$
(2) Acetylene with HBr
(3) Methane with $\text{Br}_2/h\nu$
(4) Propene with $\text{HBr}/(\text{C}_6\text{H}_5\text{COO})_2$

CHC072

NEET(UG) 2021

27. The major product formed in dehydrohalogenation reaction of 2-Bromopentane is Pent-2-ene. This product formation is based on ?

- (1) Saytzeff's Rule (2) Hund's Rule
(3) Hoffmann Rule (4) Huckel's Rule

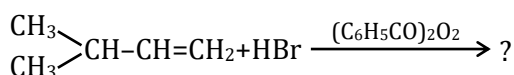
CHC073

28. $\text{CH}_3\text{CH}_2\text{COO}^-\text{Na}^+ \xrightarrow[\text{Heat}]{\text{NaOH, } +?} \text{CH}_3\text{CH}_3 + \text{Na}_2\text{CO}_3$. Consider the above reaction and identify the missing reagent/chemical.

- (1) B_2H_6 (2) Red Phosphorus
(3) CaO (4) DIBAL-H

CHC074

29. The major product of the following chemical reaction is:



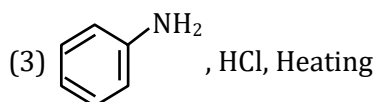
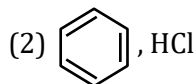
- (1) $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{CH} \\ \diagdown \\ \text{CH}_3 \end{array} - \text{CH}_2 - \text{CH}_2 - \text{Br}$
(2) $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{CH} \\ \diagdown \\ \text{CH}_3 \end{array} - \text{CH}_2 - \text{CH}_2 - \text{O} - \text{COC}_6\text{H}_5$
(3) $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{CH} \\ \diagdown \\ \text{CH}_3 \end{array} - \text{CH} - \underset{\text{Br}}{\text{CH}} - \text{CH}_3$
(4) $\begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{C} \\ \diagdown \\ \text{CH}_3 \end{array} - \text{Br} - \text{CH}_2 - \text{CH}_3$

CHC075

NEET(UG) 2022

30. Which of the following is suitable to synthesize chlorobenzene ?

- (1) Phenol, NaNO_2 , HCl, CuCl



- (4) Benzene, Cl_2 , anhydrous FeCl_3

CHC156

31. Compound X on reaction with O_3 followed by $\text{Zn}/\text{H}_2\text{O}$ gives formaldehyde and 2-methylpropanal as products. The compound X is :

- (1) 2-Methylbut-1-ene (2) 2-Methylbut-2-ene
(3) Pent-2-ene (4) 3-Methylbut-1-ene

CHC157

NEET(UG) 2023

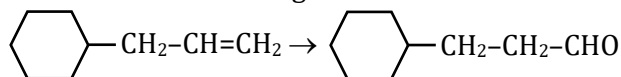
32. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :

- (1) 32 (2) 30 (3) 18 (4) 16

CHC158

NEET(UG) 2024

33. Identify the correct reagents that would bring about the following transformation



- (1) (i) $\text{H}_2\text{O}/\text{H}^+$ (ii) CrO_3
(2) (i) BH_3 (ii) $\text{H}_2\text{O}_2 / \text{OH}^-$ (iii) PCC
(3) (i) BH_3 (ii) $\text{H}_2\text{O}_2 / \text{OH}^-$ (iii) Alk. KMnO_4 (iv) H_3O^+
(4) (i) $\text{H}_2\text{O}/\text{H}^+$ (ii) PCC

CHC159

34. A compound with a molecular formula of C_6H_{14} has two tertiary carbons. Its IUPAC name is :

- (1) n-hexane
(2) 2-methylpentane
(3) 2, 3-dimethylbutane
(4) 2, 2-dimethylbutane

CHC160

35. Given below are two statements :

Statement-I : The boiling point of three isomeric pentanes follows the order n-pentane > isopentane > neopentane

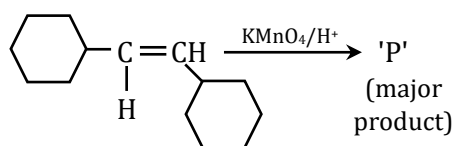
Statement-II : When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

In the light of the above statements, choose the *most appropriate* answer from the options given below :

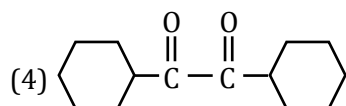
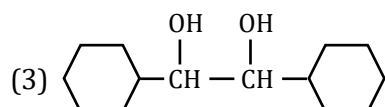
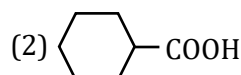
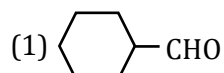
- (1) Both statement-I and Statement-II are correct
(2) Both Statement-I and Statement-II are incorrect
(3) Statement-I is correct but Statement-II is incorrect
(4) Statement-I is incorrect but Statement-II is correct

CHC161

36. For the given reaction



'P' is



CHC162

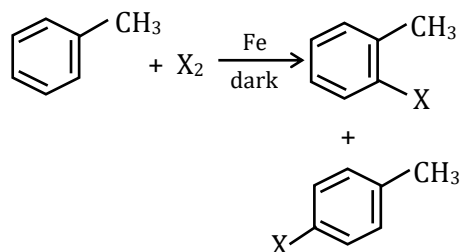
NEET(UG) 2024 (Re-examination)

37. Baeyer's reagent is

- (1) acidic potassium permanganate solution
- (2) acidic potassium dichromate solution
- (3) cold, dilute, aqueous solution of potassium permanganate
- (4) hot, concentrated solution of potassium permanganate

CHC163

38. The following reaction method

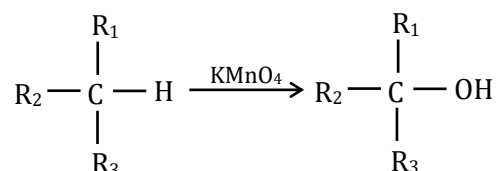


is **not** suitable for the preparation of the corresponding haloarene products, due to high reactivity of halogen, when X is :

- (1) F
- (2) I
- (3) Cl
- (4) Br

CHC164

39. The alkane that can be oxidized to the corresponding alcohol by KMnO_4 as per the equation



is, when :

- (1) $\text{R}_1 = \text{H}$; $\text{R}_2 = \text{H}$; $\text{R}_3 = \text{H}$
- (2) $\text{R}_1 = \text{CH}_3$; $\text{R}_2 = \text{CH}_3$; $\text{R}_3 = \text{CH}_3$
- (3) $\text{R}_1 = \text{CH}_3$; $\text{R}_2 = \text{H}$; $\text{R}_3 = \text{H}$
- (4) $\text{R}_1 = \text{CH}_3$; $\text{R}_2 = \text{CH}_3$; $\text{R}_3 = \text{H}$

CHC165

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	4	4	4	4	3	1	2	1	1	3	2	2	3	4
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	3	2	3	2	2	1	4	4	1	4	3	1	3	1	4
Question	31	32	33	34	35	36	37	38	39						
Answer	4	1	2	3	1	2	3	1	2						

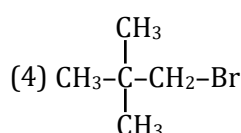
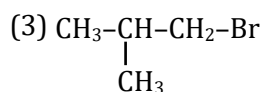
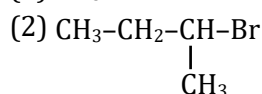
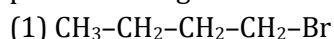
EXERCISE - III (Analytical Questions)

Master Your Understanding

1. The chain propagating step is fastest in the reaction of an alkane with
 (1) Fluorine free radical
 (2) Chlorine free radical
 (3) Iodine free radical
 (4) Bromine free radical

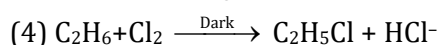
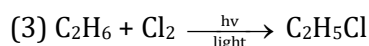
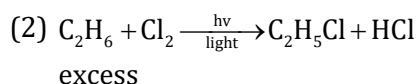
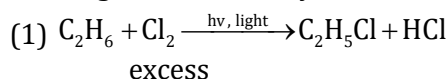
CHC097

2. What is the chief product obtained when n-butane is treated with bromine in the presence of light at 130°C ?



CHC100

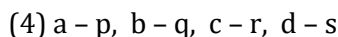
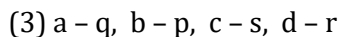
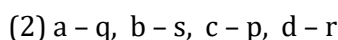
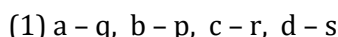
3. Which gives maximum yield of $\text{C}_2\text{H}_5\text{Cl}$



CHC122

4. Match the column-I with column-II :-

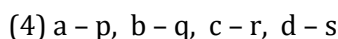
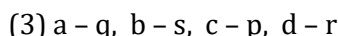
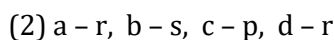
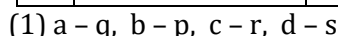
Column-I (Reaction)	Column-II (Product)
(a) $2\text{CH}_3\text{CH}_2\text{Br} \xrightarrow[\text{dry ether}]{2\text{Na}}$	(p) 
(b) $\text{CH}_3\text{COO}^\ominus\text{Na}^\oplus \xrightarrow[\Delta]{\text{CaO}+\text{NaOH}}$	(q) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
(c) $\text{CH}_3(\text{CH}_2)_4\text{CH}_3 \xrightarrow[10-20\text{atm}]{773\text{K}, \text{V}_2\text{O}_5}$	(r) $2\text{CH}_3\text{OH}$
(d) $2\text{CH}_4 + \text{O}_2 \xrightarrow[100\text{atm}]{\text{Cu}/523\text{K}}$	(s) CH_4



CHC133

5. Match the column-I with column-II :-

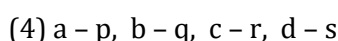
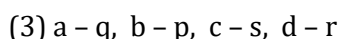
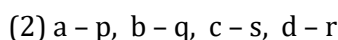
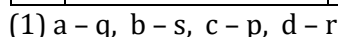
Column-I (Reaction)	Column-II (Product)
(a) $\text{CH}_4 + \text{O}_2 \xrightarrow[\Delta]{\text{Mo}_2\text{O}_3}$	(p) $(\text{CH}_3)_3\text{C-OH}$
(b) $2\text{CH}_3\text{CH}_3 + 3\text{O}_2 \xrightarrow[\Delta]{(\text{CH}_3\text{COO})_2\text{Mn}}$	(q) $\text{HCHO} + \text{H}_2\text{O}$
(c) $(\text{CH}_3)_3\text{CH} \xrightarrow[\text{Oxidation}]{\text{KMnO}_4}$	(r) $\text{CO} + 3\text{H}_2$
(d) $\text{CH}_4 + \text{H}_2\text{O} \xrightarrow[\Delta]{\text{Ni}}$	(s) $2\text{CH}_3\text{COOH} + 2\text{H}_2\text{O}$



CHC134

6. Match the column-I with column-II :-

Column-I (Reaction)	Column-II (Type of reaction)
(a) $\text{HC} \equiv \text{CH} \xrightarrow[\text{Pd}]{\text{H}_2}$	(p) Pyrolysis
(b)  $\xrightarrow[\text{AlCl}_3+\text{HCl}]{\text{Anhydrous}}$	(q) Reduction
(c)  $\xrightarrow{773\text{K}}$	(r) Free radical substitution
(d) $\text{CH}_3\text{CH}_3 \xrightarrow[h\nu]{\text{Cl}_2}$	(s) Isomerisation



CHC135

7. Which of the following statements is/are incorrect :-

(A) In alkenes first three members are gases, the next 14 are liquid & the higher ones are solids.

(B) Except ethene all other alkenes are colourless & odourless.

(C) Straight chain alkenes have higher boiling point than isomeric branched chain compounds.

(D) Generally alkenes are soluble in water & insoluble in non polar solvents.

- (1) A, B & C only (2) Only D
(3) B & D only (4) B, C & D only

CHC154

8. Which of the following is maximum reactive for NBS

- (1) PhCH_3 (2) $\text{PhCH}_2\text{—CH}_3$
(3) $\text{PhCH}_2\text{—CH=CH}_2$ (4) $\text{Ph}\text{—}\underset{\text{CH}_3}{\text{CH}}\text{—CH=CH}_2$

CHC077

9. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous NaOH gives

- (1) o-cresol
- (2) p-cresol
- (3) 2, 4-dihydroxy toluene
- (4) Benzyl alcohol

CHC121

- 10.** Only two isomeric monochloro derivatives are possible for (exclude stereo isomers)

- (1) n-butane
- (2) 2, 4-dimethyl pentane
- (3) Benzene
- (4) 2-methyl butane

CHC099

11. Isobutylene $\xrightarrow[\text{H}_2\text{O}_2]{\text{HBr}}$ "product". The product is

- (1) Isobutyl bromide
- (2) Tert. butyl bromide
- (3) Tert. butyl alcohol
- (4) isobutyl alcohol

CHC095

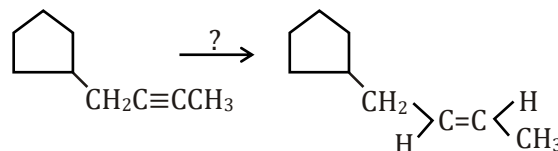
- 12.** Match the column-I with column-II :-

Column-I		Column-II	
(a)	$\text{CH}_3 - \text{CH} = \text{CH}_2$ $\xrightarrow[\text{H}_2\text{O}]{\text{H}^\oplus} \text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$	(p)	Hydrogenation
(b)	$\text{CH}_3 - \text{CH} = \text{CH}_2$ $\xrightarrow[\text{R}_2\text{O}_2]{\text{HBr}}$ $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Br}$	(q)	Hydration
(c)	$\text{CH}_3 - \text{CH} = \text{CH}_2$ $\xrightarrow[\text{CCl}_4]{\text{Br}_2}$ $\text{CH}_3 - \underset{\text{Br}}{\text{CH}} - \text{CH}_2 - \text{Br}$	(r)	Halogenation
(d)	$\text{CH}_2 = \text{CH}_2$ $\xrightarrow[\text{Pd}]{\text{H}_2} \text{CH}_3 - \text{CH}_3$	(s)	Hydrohalogenation

- (1) $a - s, b - r, c - q, d - p$
- (2) $a - q, b - s, c - r, d - p$
- (3) $a - r, b - s, c - p, d - q$
- (4) $a - p, b - q, c - r, d - s$

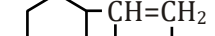
CHC139

- 13.** Reagent used to carry out following alkyne to alkene is



- (1) Pd-C/H₂ (2) Na/NH₃
(3) Pd/H₂ (4) Ni/H₂

CHC079

14. 

Schemes; A, B and C are :-

- (1) Simple hydration
- (2) Hydroboration, $\text{Hg}^{+2} / \text{H}_2\text{O}$ and NaBH_4 , hydration
- (3) Hydration, hydroboration, $\text{Hg}^{+2} / \text{H}_2\text{O}$ and NaBH_4 ,
- (4) $\text{Hg}^{+2} / \text{H}_2\text{O}$ and NaBH_4 , hydration, hydroboration

CHC080

15. Match the column-I with column-II :-

Column-I		Column-II	
(a)	Lindlar's catalyst	(p)	Na/liq. NH ₃
(b)	Birch catalyst	(q)	H ₂ /Pd-CaCO ₃
(c)	Baeyer's Reagent	(r)	HBr/(PhCO) ₂ O ₂
(d)	Kharasch effect	(s)	Dil. KMnO ₄ /273K

(1) a - q, b - p, c - r, d - s

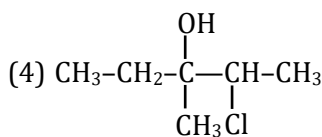
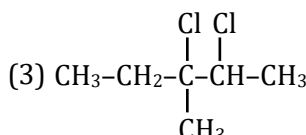
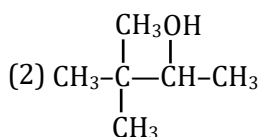
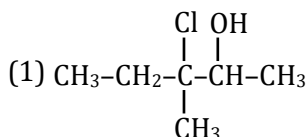
(2) a - p, b - q, c - s, d - r

(3) a - q, b - p, c - s, d - r

(4) a - p, b - q, c - r, d - s

CHC132

16. The predominant product formed when 3-methyl-2-pentene reacts with HOCl is



CHC090

17. Correct reactivity order for EAR of following compounds is



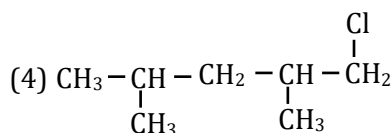
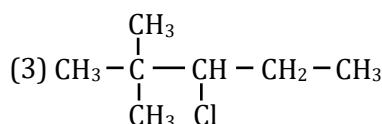
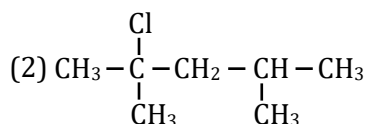
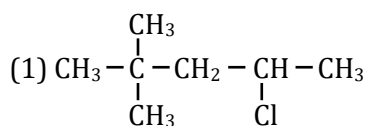
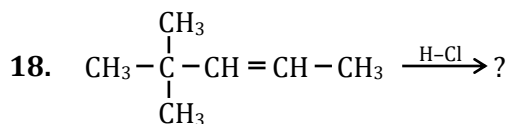
(1) IV > I > II > III

(2) III > II > I > IV

(3) II > III > I > IV

(4) II > III > IV > I

CHC082



CHC081

19. Which of the following alkene is most reactive for hydration

(1) Ethene

(2) Propene

(3) 1-butene

(4) 2-methyl propene

CHC086

20. Which of the following alkenes on hydration gives a tertiary alcohol

(1) 2-Butene

(2) Isobutylene

(3) Ethene

(4) α-Butylene

CHC089

21. Propene on addition with HI, gives

(1) CH₃-CHI-CH₃

(2) CH₃-CH₂-CH₂I

(3) CH₃-CHI-CH₂I

(4) None of the above

CHC091

22. 3-Phenyl propene on reaction with HBr gives (as a major product)

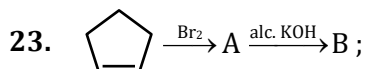
(1) C₆H₅CH₂CH(Br)CH₃

(2) C₆H₅CH(Br)CH₂CH₃

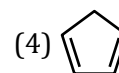
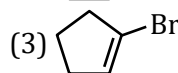
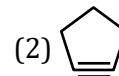
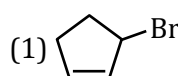
(3) C₆H₅CH₂CH₂CH₂Br

(4) C₆H₅CH(Br)CH=CH₂

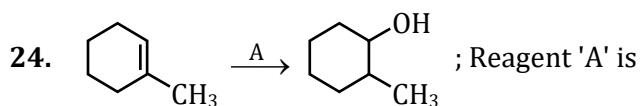
CHC093



What is the structure of B

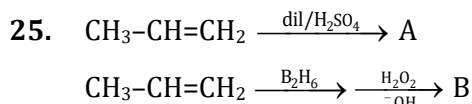


CHC076



- (1) $\text{BH}_3, \text{H}_2\text{O}_2/\text{OH}^-$ (2) $\text{H}_2\text{O}/\text{H}^+$
(3) $\text{Hg}^{+2}, \text{H}_2\text{O}/\text{NaBH}_4$ (4) $\text{Cl}_2/\text{aq. NaOH}$

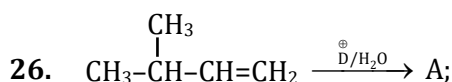
CHC088



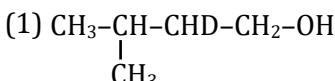
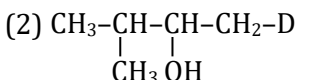
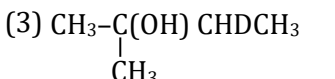
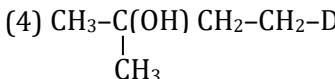
Wrong statement about the product is

- (1) A and B have the same functional group
(2) A and B are position isomers.
(3) A and B show chain isomerism
(4) Mixed ether is the isomer of both A and B

CHC085



A (major product) is

- (1) 
(2) 
(3) 
(4) 

CHC113

27. The intermediate during the addition of HCl to propene in the presence of peroxide is

- (1) $\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{Cl}$ (2) $\text{CH}_3\text{CH}^+\text{-CH}_3$
(3) $\text{CH}_3\text{-CH}_2\text{-CH}_2^+$ (4) $\text{CH}_3\dot{\text{C}}\text{HCH}_3$

CHC083

28. Reaction of HBr with propene in the presence of peroxide gives

- (1) 3-bromo propane (2) Allyl bromide
(3) n-propyl bromide (4) Isopropyl bromide

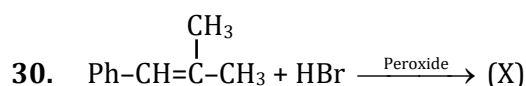
CHC094

29. In given statements which is/are correct :-

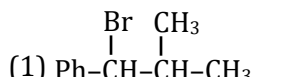
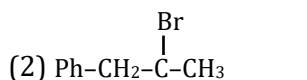
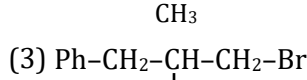
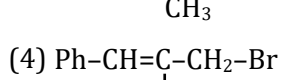
- (A) Cis & Trans isomers have same structure but have different configuration (arrangement of atoms or groups)
(B) Cis-2-butene has more boiling point than trans-2-butene.
(C) Trans-2-butene has more dipole moment than cis-2-butene.
(D) Geometrical isomerism is also shown by alkenes of the types XY C = C XZ and XY C = C ZW.

- (1) A, B, C & D (2) Only A, B
(3) Only A, B & C (4) Only A, B & D

CHC153



'X' is

- (1) 
(2) 
(3) 
(4) 

CHC112

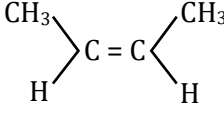
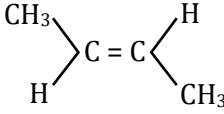
31. Match the column :-

Column-I (Reaction)		Column-II (Product)	
(a)	$\text{HC}\equiv\text{CH} + \text{H}_2\text{O} \rightarrow$	(p)	Benzene
(b)	$\text{HC}\equiv\text{CH} + \text{H}_2\text{O} \xrightarrow{\text{Hg}^{+2}/\text{H}^+}$	(q)	Ammonia
(c)	$\text{HC}\equiv\text{CH} + \text{NaNH}_2 \rightarrow$	(r)	No reaction
(d)	$\text{HC}\equiv\text{CH} \xrightarrow[\text{Fetube}]{\text{Red hot}}$	(s)	Acetaldehyde

- (1) a - q, b - p, c - r, d - s
(2) a - r, b - s, c - q, d - p
(3) a - q, b - p, c - s, d - r
(4) a - p, b - q, c - r, d - s

CHC128

32. Match the column-I with column-II :-

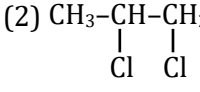
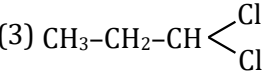
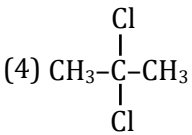
Column-I (Reaction)	Column-II (Product)
(a) $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3$ $\xrightarrow[\text{Pd/C}]{\text{H}_2}$	(p) 
(b) $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3$ $\xrightarrow{\text{Na/liq.NH}_3}$	(q) $\text{CH}_3-\text{C}\equiv\text{C}^\ominus\text{Na}^\oplus$
(c) $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3$ $\xrightarrow[\text{Quinoline}]{\text{H}_2/\text{Pd-C}}$	(r) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
(d) $\text{CH}_3-\text{C}\equiv\text{CH}$ $\xrightarrow{\text{Na/liq.NH}_3}$	(s) 

- (1) a - s, b - r, c - q, d - p
 (2) a - p, b - s, c - r, d - q
 (3) a - r, b - s, c - p, d - q
 (4) a - p, b - q, c - r, d - s

CHC136

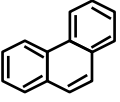
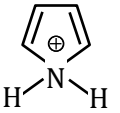
33. What is the main product of this reaction?



- (1)  (2) 
 (3)  (4) 

CHC092

34. Match the column :-

Column-I	Column-II
(a) Aromatic	(p) 
(b) Anti aromatic	(q) 
(c) Non-aromatic	(r) 
	(s) 

- (1) a - q, b - p, c - r, s
 (2) a - p, b - q, c - r, s
 (3) a - r, b - q, c - p, s
 (4) a - p, s, b - q, c - r

CHC130

35. Match the column-I with column-II :-

Column-I (Compound)	Column-II (Boiling point)
(a) 2-Methyl propane	(p) 309.1 K
(b) Pentane	(q) 282.5 K
(c) 2-Methyl butane	(r) 261 K
(d) 2,2-Dimethylpropane	(s) 300.9 K

- (1) a - r, b - p, c - s, d - q
 (2) a - q, b - r, c - s, d - p
 (3) a - r, b - s, c - q, d - p
 (4) a - s, b - r, c - q, d - p

CHC137

36. Correct order of reactivity of following compound with an electrophile :-

- (I) $\text{p-CH}_3-\text{C}_6\text{H}_4-\text{CH}_3$ (II) $\text{C}_6\text{H}_5-\text{CH}_3$
 (III) $\text{p-CH}_3-\text{C}_6\text{H}_4-\text{NO}_2$ (IV) $\text{p-O}_2\text{N-C}_6\text{H}_4-\text{NO}_2$
 (1) I > II > III > IV (2) II > I > IV > III
 (3) III > II > I > IV (4) IV > III > II > I

CHC103

37. Toluene is more reactive than benzene towards electrophilic reagents due to :-

- (1) Inductive effect only
 (2) Hyperconjugative effect only
 (3) Both inductive as well as hyperconjugative effects
 (4) Strong mesomeric effect

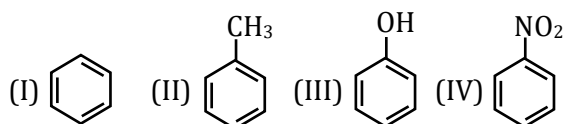
CHC104

38. Nitration of benzene is

- (1) Nucleophilic substitution
 (2) Nucleophilic addition
 (3) Electrophilic substitution
 (4) Electrophilic addition

CHC105

39. Consider the following compounds :



Correct order of their reactivity in electrophilic substitution reactions would be:-

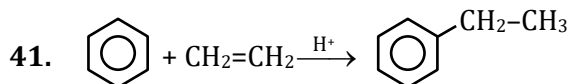
- (1) I > II > III > IV (2) IV > III > II > I
 (3) III > II > I > IV (4) III > IV > I > II

CHC106

40. The active species in the nitration of benzene is

- (1) NO_2^+ (2) HNO_3
(3) NO_3^- (4) NO_2^-

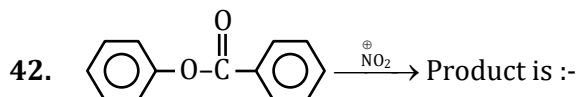
CHC107



Incorrect statement about this reaction

- (1) Benzene is substrate
(2) Ethene is reagent
(3) Reaction is EAR with respect to ethene
(4) Reaction is NSR for benzene

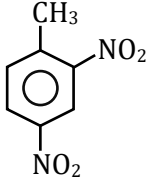
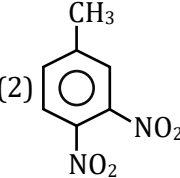
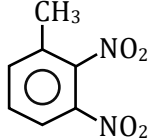
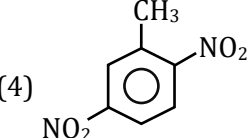
CHC110



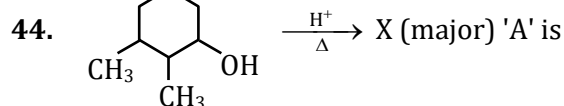
- (1)  - $\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_4\text{NO}_2$
(2)  - $\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_4\text{NO}_2$
(3)  - $\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_5$
(4)  - $\text{O}-\text{C}(=\text{O})-\text{C}_6\text{H}_5$

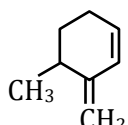
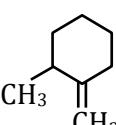
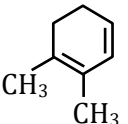
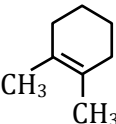
CHC116

43. p-nitro toluene on further nitration gives

- (1)  (2) 
(3)  (4) 

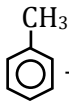
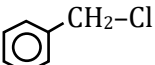
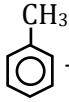
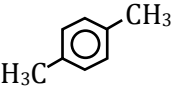
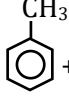
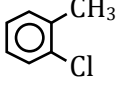
CHC117



- (1)  (2) 
(3)  (4) 

CHC125

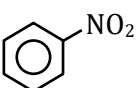
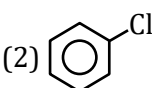
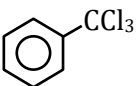
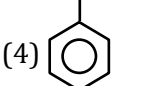
45. Match the column :-

Column-I (Reaction)		Column-II (Product)	
(a)	 + $\text{Cl}_2 \xrightarrow{\text{AlCl}_3}$	(p)	
(b)	 + $\text{Cl}_2 \xrightarrow{h\nu}$	(q)	
(c)	 + $\text{CH}_3\text{Cl} \xrightarrow{\text{AlCl}_3}$	(r)	

- (1) a - q, b - p, c - r (2) a - r, b - p, c - q
(3) a - q, b - r, c - p (4) a - p, b - q, c - r

CHC131

46. In which of the following compound the electrophile attack on o- and p- positions :

- (1)  (2) 
(3)  (4) 

CHC109

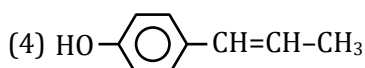
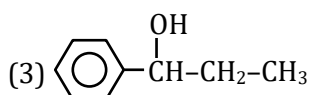
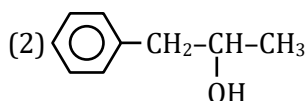
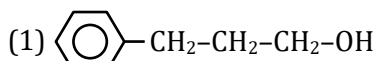
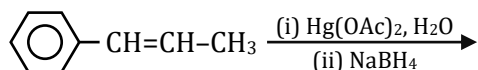
47. Which of the following reactions show that there are three C=C bond in benzene

- (a) $\text{C}_6\text{H}_6 + \text{Br}_2 \xrightarrow{\text{FeBr}_3}$
(b) $\text{C}_6\text{H}_6 + \text{HNO}_3 \xrightarrow{\text{H}_2\text{SO}_4}$
(c) $\text{C}_6\text{H}_6 + 3\text{O}_3 \longrightarrow$
(d) $\text{C}_6\text{H}_6 + 3\text{H}_2 \xrightarrow{\text{Ni}}$

- (1) a, c (2) b, d (3) b, c, d (4) c, d

CHC078

48. The major product of the following reaction is



CHC087

49. Halogenation of alkanes gives a mixture of monohalo products. The ease of substitution follows the order

(1) Tertiary H > primary H > secondary H

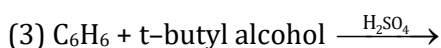
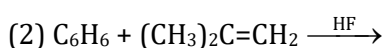
(2) Primary H < secondary H < tertiary H

(3) Primary H > secondary H > tertiary H

(4) Secondary H > tertiary H < primary H

CHC119

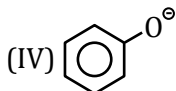
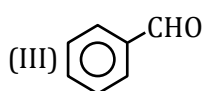
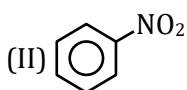
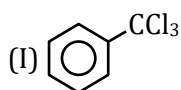
50. Which of the following reaction gives t-butyl benzene:



(4) All of them

CHC118

51. Electrophile NO_2^+ attacks the following :



in which cases NO_2^+ will attack at meta position

(1) II and IV

(2) I, II and III

(3) III and IV

(4) I only

CHC123

52. Match the column :-

Column-I (Reaction)		Column-II (Type of reaction)	
(a)	$\text{C}_6\text{H}_6 + \text{Cl}_2 \xrightarrow{\text{AlCl}_3}$	(p)	Free radical addition
(b)	$\text{C}_6\text{H}_6 + \text{Cl}_2 \xrightarrow[\text{(excess)}]{h\nu}$	(q)	Free radical substitution
(c)	$\text{CH}_4 + \text{Br}_2 \xrightarrow{h\nu}$	(r)	Electrophilic addition
(d)	$\text{C}_6\text{H}_6 + \text{HCl} \longrightarrow$	(s)	Electrophilic substitution

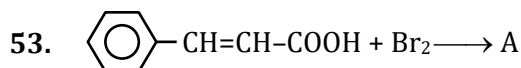
(1) a - p, b - q, c - s, d - r

(2) a - q, b - p, c - s, d - r

(3) a - p, b - q, c - r, d - s

(4) a - s, b - p, c - q, d - r

CHC129



the number of chiral carbons in 'A' are

(1) 1

(2) 2

(3) 3

(4) 4

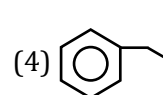
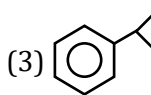
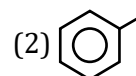
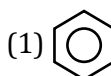
CHC084

54. The strongest deactivating effect on aromatic ring is

(1) $-\text{CH}_2\text{Cl}$ (2) $-\text{OCH}_3$ (3) $-\text{CH}_3$ (4) $-\text{CCl}_3$

CHC101

55. Which of the following is maximum reactive towards E.S.R. :-



CHC102

56. The function of anhydrous AlCl_3 in the Friedel craft's reaction

(1) To absorb water

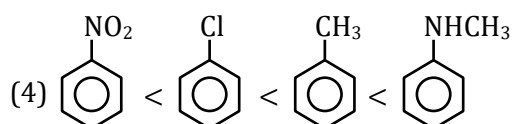
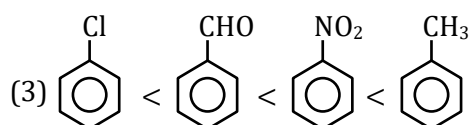
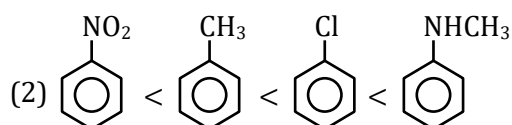
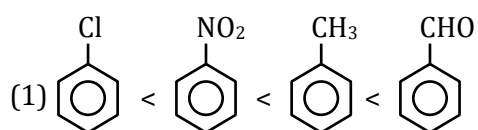
(2) To absorb HCl

(3) To produce electrophile

(4) To produce Nucleophile

CHC108

57. Identify correct order of reactivity for electrophilic substitution reaction of the following compounds :-



CHC115

58. Which is not correct about nitration ?

- (1) NO_2^+ is an attacking electrophile
 (2) In general, nitration is monosubstitution process
 (3) In nitrating mix, HNO_3 acts as acid, & H_2SO_4 acts as base
 (4) In nitrating mix, HNO_3 acts as base, & H_2SO_4 acts as an acid

CHC126

EXERCISE-III (Analytical Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	2	2	2	3	1	2	4	4	1	1	2	2	2	3
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	4	2	1	4	2	1	2	4	1	3	4	2	3	4	2
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	2	3	4	3	1	1	3	3	3	1	4	3	1	4	2
Question	46	47	48	49	50	51	52	53	54	55	56	57	58		
Answer	2	4	3	2	4	2	4	2	4	2	3	4	3		