Additional Problems For Self Practice (APSP)

✍ **Marked questions are recommended for Revision.**

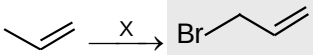
This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

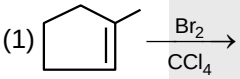
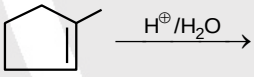
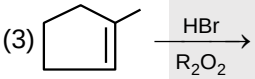
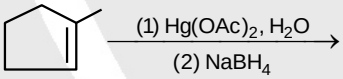
PART - I : PRACTICE TEST-1 (IIT-JEE (MAIN Pattern))

Max. Time : 1 Hr. **Max. Marks : 120**

Important Instructions

1. The test is of **1 hour** duration.
2. The Test Booklet consists of **30** questions. The maximum marks are **120.**
3. Each question is allotted **4 (four)** marks for correct response.
4. Candidates will be awarded marks as stated above in Instructions No. 3 for correct response of each question. **¼ (one fourth)** marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
5. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 4 above.

1. 
x is :
(1) Br_2 / H_2O (2) HBr (3) HBr / Peroxide (4) NBS

2. Which of the following reactions is not an electrophilic addition reactions –
(1)  (2) 
(3)  (4) 

3. ✍ The chlorination of Toluene in presence of ferric chloride gives predominatly :
(1) Benzyl chloride (2) m-Chlorotoluene (3) Benzal chloride (4) o-and p-Chlorotoluene

4. ✍ Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4. In the nitrating mixture HNO_3 acts as a :
(1) Base (2) Acid (3) Reducing agent (4) Catalyst

5. Ethylbenzene + $Cl_2 \xrightarrow{Light}$ major product is :
(1) o- & p-chloroethylbenzene (2) 1-Chloroethylbenzene
(3) 2- Chloroethylbenzene (4) m-Chloroethylbenzene

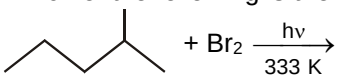
6. ✍ Which of the following is not o, p-directing group?
(1) $–NH_2$ (2) –OH (3) –X(halogens) (4) –CHO

7. Presence of a cyano group in a benzene ring.
(1) Activates the ring towards electrophilic substitution.
(2) Renders the ring basic.
(3) Deactivates the ring towards nucleophilic substitution.
(4) Deactivates the ring towards electrophilic substitution.

8. The relative rates of mononitration of $R–C_6H_5$, where $R=CH_3$, $–NO_2$, –OH, –Cl are :
(1) $CH_3 > OH > NO_2 > Cl$ (2) $OH > Cl > CH_3 > NO_2$
(3) $OH > CH_3 > NO_2 > Cl$ (4) $OH > CH_3 > Cl > NO_2$

9. In the free radical chlorination of Methane, the chain initiating step involves the formation of
(1) Chlorine radical (2) Hydrogen chloride (3) Methyl radical (4) Chloromethyl radical.

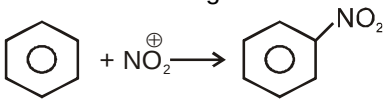
10. Which of the following is the major product for the given reaction ?



(1) 2-Bromo-2-methylpentane
(2) 1-Bromo-2-methylpentane
(3) 4-Bromo-2-methylpentane
(4) 3-Bromo-2-methylpentane

11. Allylic bromination of an olefin is :
(1) Nucleophilic substitution
(2) Electrophilic substitution
(3) Free radical substitution
(4) Electrophilic addition.

12. Which of the following is free radical addition reaction ?

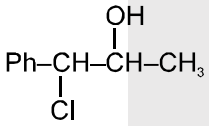
(1) 

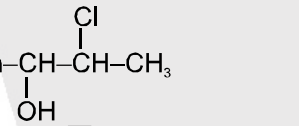
(2) $CH_2=CH_2 + HBr \longrightarrow CH_3–CH_2–Br$

(3) $CH_3–CH=CH_2 + HBr \xrightarrow{R_2O_2} CH_3–CH_2–CH_2–Br$

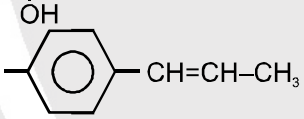
(4) $CH_3–CH=CH_2 + HCl \longrightarrow CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3$

13. $Ph–CH=CH–CH_3 \xrightarrow{HOCl} X$, X is :

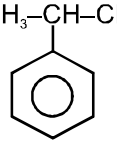
(1) 

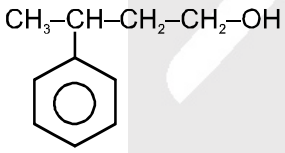
(2) 

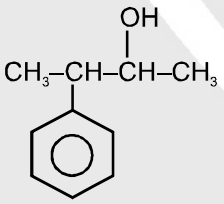
(3) $Ph–CH=CH–CH_2Cl$

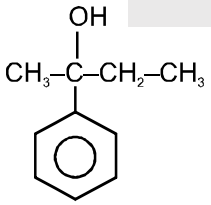
(4) 

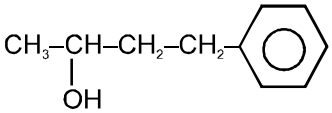
14. $CH_3–CH–CH=CH_2 \xrightarrow{H_3O^+}$ P (major), P is :



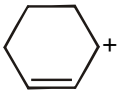
(1) 

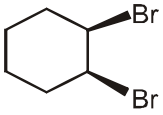
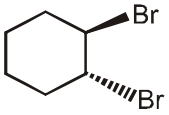
(2) 

(3) 

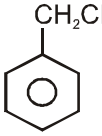
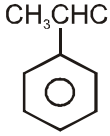
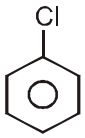
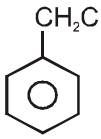
(4) 

15. To which of the following compounds Br_2 adds most readily.
(1) $CH_2=CH_2$
(2) $CH_3–CH=CH_2$
(3) $CH_3–CH=CH–CH_3$
(4) $CH_3 – \underset{\displaystyle CH_3}{\underset{|}{C}} = CH – CH_3$.

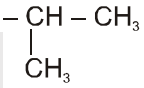
16.  + Br_2 ⟶ P, P will have configuration:

(1)  (2)  (3) both are true (4) none is true

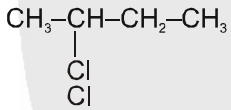
17.  + $CH_3CH_2CH_2Cl \xrightarrow{AlCl_3}$ Major Product

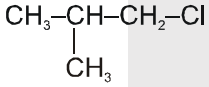
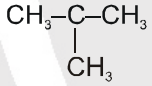
(1)  (2)  (3)  (4) 

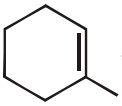
18. Which is the most reactive alkane towards bromination in presence of sunlight ?

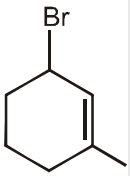
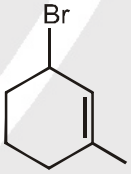
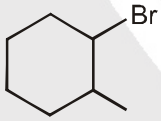
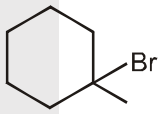
(1) CH_3CH_3 (2) CH_4 (3) $CH_3CH_2CH_3$ (4) 

19. $CH_3–CH_2–CH_2–CH_3 + Cl_2 \xrightarrow{h\nu}$ Major product :

(1) $CH_3–CH_2–CH_2–CH_2–Cl$ (2) 

(3)  (4) 

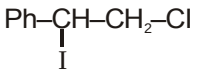
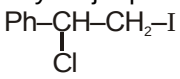
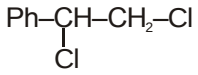
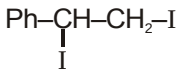
20.  + HBr $\xrightarrow{R_2O_2}$ Product; Product is :

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

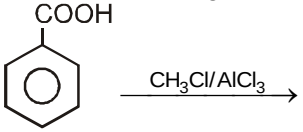
21. Which of the following is the predominant product in the reaction of HOBr with propene ?

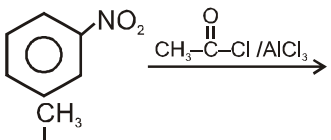
(1) 2-Bromo-1-propanol (2) 3-Bromo-1-propanol
(3) 2-Bromo-2-propanol (4) 1-Bromo-2-propanol.

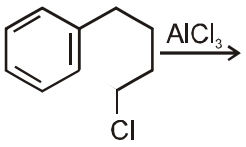
22. $Ph–CH=CH_2 \xrightarrow{ICl}$ P, Identify major product 'P' is :

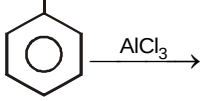
(1)  (2)  (3)  (4) 

23. Which of the following reaction is feasible ?

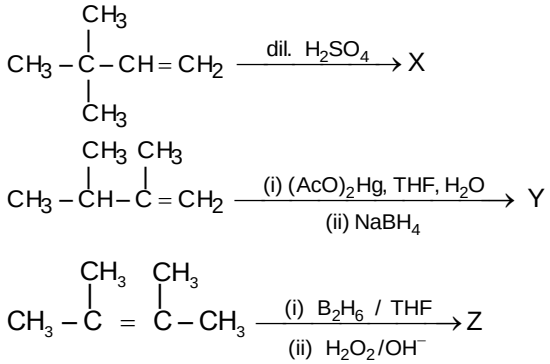
(1) 

(2) 

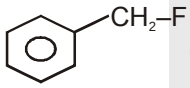
(3) 

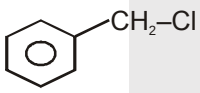
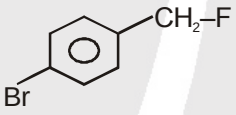
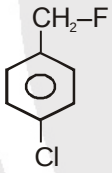
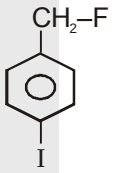
(4) 

24. o,p-directing group are mostly :
(1) Activating group (2) Deactivating groups
(3) Neutral groups (4) None of these

25. 

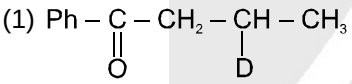
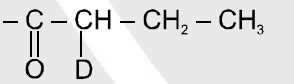
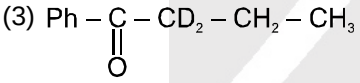
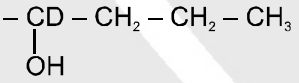
(1) All three products (X, Y, Z) are different. (2) X and Y are identical but Z is different.
(3) Y and Z are identical but X is different. (4) All three products (X, Y, Z) are identical.

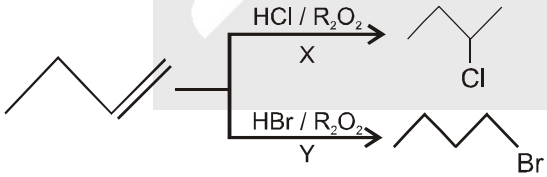
26.  + IBr + $AlCl_3$ ⟶ Product is :

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

27. When HBr adds to 1-Butene in the presence of benzoyl peroxide, the products is
(1) 1-Bromobutane (2) 2-Bromobutane (3) 1-Bromobutene (4) 2-Bromobutene.

28. $Ph–C\equiv C–CH_2–CH_3 \xrightarrow[D_2SO_4/D_2O]{Hg^{2+}/D^{\oplus}}$ A, A is :

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

29. 

Which is correct statement about X and Y.
(1) X is product of ionic reaction and Y is product of radical reaction.
(2) X and Y both are product of ionic reaction.
(3) X and Y both are product of radical reaction.
(4) X is product of radical reaction and Y is product of ionic reaction.

30. Which of the following is the best reagent to convert 1-Methylcyclohexene into 2-methylcyclohexanol ?
(1) Dil H_2SO_4 (2) $Hg(OAc)_2$ / $NaBH_4$, H_2O
(3) B_2H_6/H_2O_2, $\overset{\ominus}{O}H$ (4) Conc. H_2SO_4

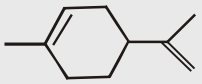
Practice Test-1 (IIT-JEE (Main Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

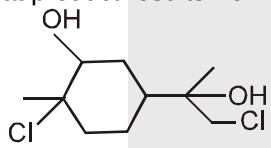
Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

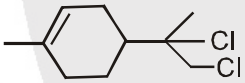
PART - II : NATIONAL STANDARD EXAMINATION IN CHEMISTRY (NSEC) STAGE-I

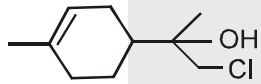
1. The alkene limonene has the following structure,

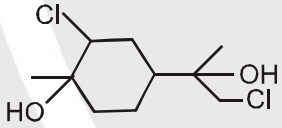


What product results from the reaction of limonene and chlorine water ? **[NSEC-2000]**

(A) 

(B) 

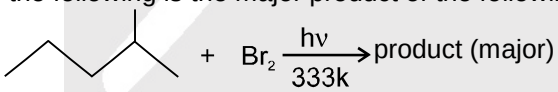
(C) 

(D) 

2. An unknown compound is analyzed to have a molecular mass of 84 and elements has carbon and hydrogen only. When subjected to chlorination in the presence of light, three monochlorinated products are isolated. This compound must be **[NSEC-2000]**

(A) methylcyclopentane (B) cyclohexane
(C) hexane (D) 1,3-dimethylcyclobutane

3. Which of the following is the major product of the following reaction ? **[NSEC-2000]**



(A) 3-bromo-2-methylpentane (B) 2-bromo-2-methylpentane
(C) 1-bromo-2-methylpentane (D) 4-bromo-2-methylpentane

4. The peroxide effect occurs by : **[NSEC-2001]**

(A) ionic mechanism (B) homolytic fission of double bond
(C) heterolytic fission of double bond (D) free radical mechanism

5. Benzene does not readily undergo **[NSEC-2002]**

(A) halogenation (B) nitration
(C) sulphonation (D) oxidation.

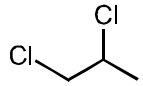
6. Which compound amongst the following is nitrated with most difficulty ? **[NSEC-2002]**

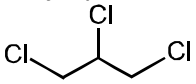
(A) nitrobenzene (B) m-dinitrobenzene
(C) phenol (D) quinol.

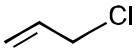
7. The reaction of toluene with chlorine in the dark and in presence of $FeCl_3$ gives predominantly.

(A) benzoyl chloride (B) benzyl chloride **[NSEC-2002]**
(C) m-chlorotoluene (D) a mixture of o-and p-chlorotoluenes.

8. In the reaction of chlorine with propene at 450°C, the major product is **[NSEC-2003]**

(A) 

(B) 

(C) 

(D) 

9. In the nitration of an aromatic compound using a mixture of concentrated nitric acid and sulphuric acid, the acids respectively function as **[NSEC-2003]**

(A) an oxdidising agent and an acid (B) a Bronsted and a Lewis acid
(C) a base and an acid (D) an acid and an oxidising agent.

10. Select the major product obtained from the addition of HBr to 1-methylcyclohexene. **[NSEC-2005]**

(A) 1-bromo-2-methylcyclohexane (B) 6-bromo-1-methylcyclohex-l-ene
(C) 3-bromo-1-methylcyclohex-1-ene (D) 1-bromo-1-methylcyclohexane.

11. Reaction of benzene with isobutylchloride ($CH_3CH(CH_3)CH_2Cl$) in the presence of anhydrous $AlCl_3$ yields **[NSEC-2005]**

(A) tert-butylbenzene (B) iso-butylbenzene
(C) n-butylbenzene (D) chlorobenzene.

12. The reagent system for preparing propan-1-ol from propene is **[NSEC-2006]**

(A) $Hg(OAc)_2/H_2O$ followed by $NaBH_4$ (B) H_2SO_4/H_2O
(C) B_2H_6 followed by H_2O_2 (D) HCO_2H/H_2SO_4.

13. In Friedel - Craft acylation, the amount of $AlCl_3$ that must be taken is **[NSEC-2006]**

(A) in catalytic amount (B) one equivalent
(C) more than one equivalent (D) amount does not matter.

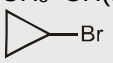
14. For a Friedel-Craft reaction using $AlCl_3$, which compound can be used as solvent, benzene or nitrobenzene?

(A) nitrobenzene but not benzene (B) benzene but not nitrobenzene **[NSEC-2006]**
(C) both benzene and nitrobenzene (D) neither benzene nor nitrobenzene.

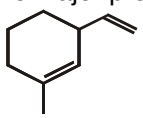
15. The major product of the following reaction is **[NSEC-2006]**

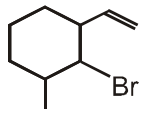
$CH_3–CH = CH_2 + HBr \xrightarrow{(C_6H_5CO)_2O_2}$

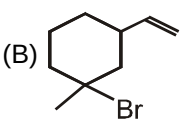
(A) $CH_3–CH_2–CH_2–Br$ (B) $CH_3–CH(Br)–CH_3$

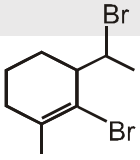
(C) $BrCH_2–CH=CH_2$ (D) 

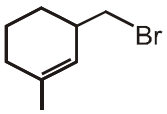
16. The major product formed upon addition of 1 mole of HBr in the following reactions is : **[NSEC-2007]**

 $\xrightarrow{HBr(1\ mole)}$ Major product ?

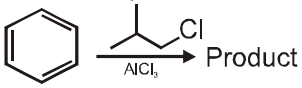
(A) 

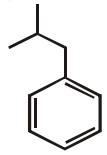
(B) 

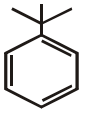
(C) 

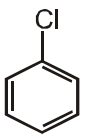
(D) 

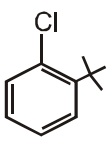
17. Predict the product formed in the following reaction **[NSEC-2007]**



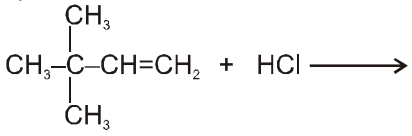
(A) 

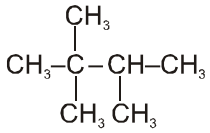
(B) 

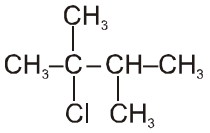
(C) 

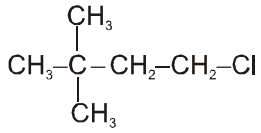
(D) 

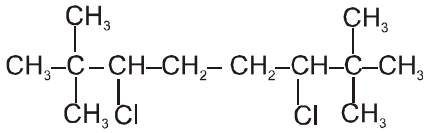
18. What is the major product that will be formed in the following reacton ? **[NSEC-2008]**



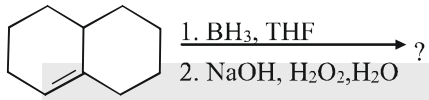
(A) 

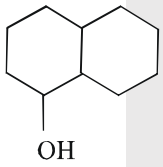
(B) 

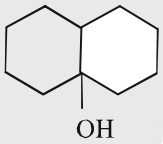
(C) 

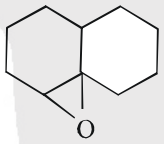
(D) 

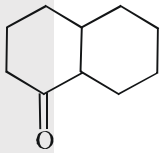
19. The major product in the following reaction is **[NSEC-2008]**



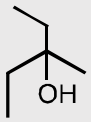
(A) 

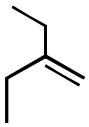
(B) 

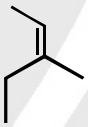
(C) 

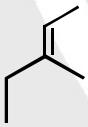
(D) 

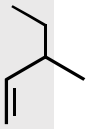
20. Identify the alkene which will not provide the following alcohol upon oxymercuration demercuration. **[NSEC-2008]**



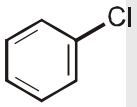
(A) 

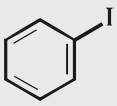
(B) 

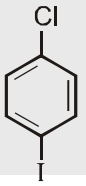
(C) 

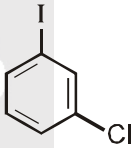
(D) 

21. The compound X in the reaction,  + ICl $\xrightarrow{\text{anhydrous } AlCl_3}$ X is : **[NSEC-2009]**

(A) 

(B) 

(C) 

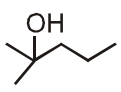
(D) 

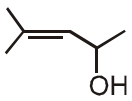
22. Cyclohexene reacts with limited amount of bromine in the presence of light to form product X (C_6H_9Br). The statement correct about X is : **[NSEC-2010]**

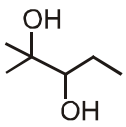
(A) It is a racemate. (B) It is a product of an addition reaction.
(C) It is formed through a cationic intermediate. (D) It is optically active.

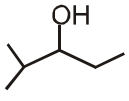
23. The major product of the following reaction is : **[NSEC-2010]**

$(CH_3)_2C{=}CH{-}CH_2{-}CH_3 \xrightarrow{\text{(i) } B_2H_6,\ \text{ether (ii) } H_2O_2,\ NaOH}$

(A) 

(B) 

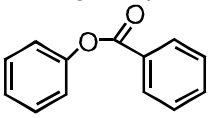
(C) 

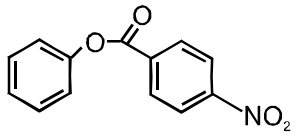
(D) 

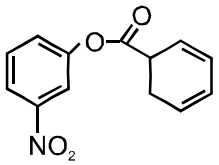
24. The compound which does not react with bromine easily at room temperature is **[NSEC-2010]**

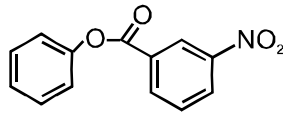
(A) phenol (B) 2-butyne (C) chlorobenzene (D) 1-pentene

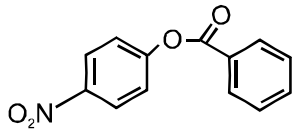
25. Major product of mononitration of the following compound is **[NSEC-2011]**



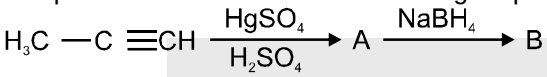
(A) 

(B) 

(C) 

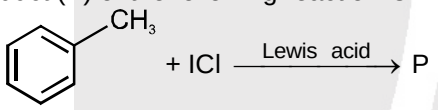
(D) 

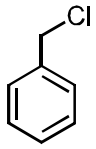
26. The product obtained from the following sequence of reactions is **[NSEC-2011]**

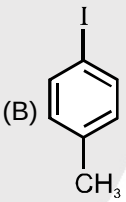


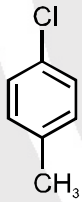
(A) propanal (B) 2-propanol (C) 1-propanol (D) propane

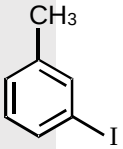
27. The product (P) of the following reaction is **[NSEC-2011]**



(A) 

(B) 

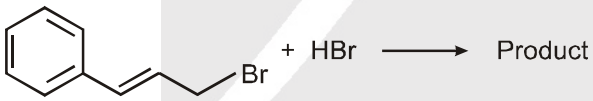
(C) 

(D) 

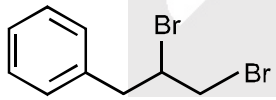
28. Which isomer of xylene can give three different monochloro derivatives? **[NSEC-2012]**

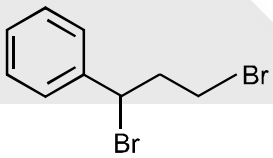
(A) o-xylene (B) m-xylene

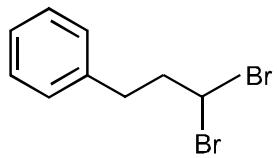
(C) p-xylene (D) xylene cannot give a monochioro derivative

29.  **[NSEC-2012]**

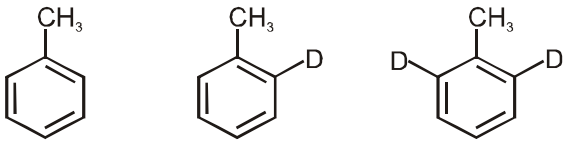
The 'product' in the above reaction is :

(A) 

(B) 

(C) 

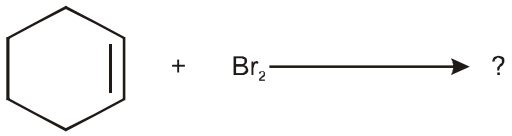
(D) This reaction cannot take place

30.  **[NSEC-2012]**

I II III

The rate of o-nitration of the above compounds, (I) toluene, (II) 2-D-toluene and (III) 2, 6-D_2-toluene are is in the following order

(A) I > II > III
(B) II > I > III
(C) III > I > II
(D) The rate is the same for all the three compounds

31. 

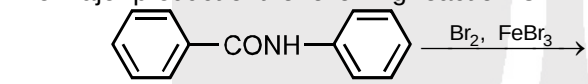
[NSEC-2013]

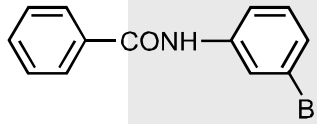
Cyclohexene Product

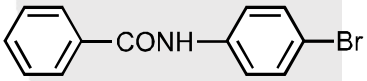
The correct name of the product obtained is
(A) cis-1,2-dibromocyclohexane
(B) cis-1,4-dibromocyclohexane
(C) trans-1,2-dibromocyclohexane
(D) trans-1,4-dibromocyclohexane

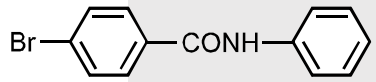
32. Which of the following statements is correct ? **[NSEC-2013]**
(A) $–NO_2$ group activates the benzene ring for attack of electrophile at ortho and para position.
(B) $–NH_2$ group activates the benzene ring for attack of electrophile at ortho and para position.
(C) Both $–NO_2$ group as well as $–NH_2$ group activate the benzene ring for attack of electrophile at ortho and para position.
(D) Neither $–NO_2$ group nor $–NH_2$ group activate the benzene ring for attack of electrophile at ortho and para position.

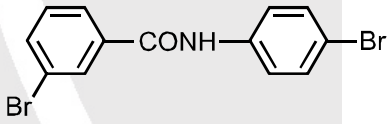
33. The major product of the following reaction is **[NSEC-2014]**



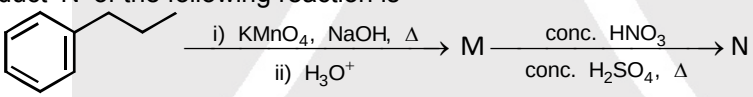
(A) 

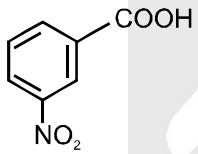
(B) 

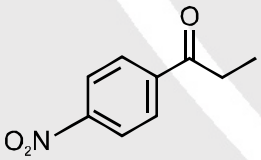
(C) 

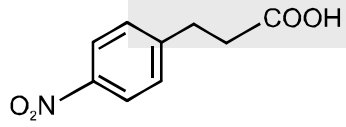
(D) 

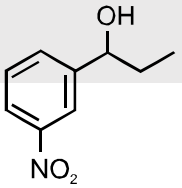
34. The product 'N' of the following reaction is **[NSEC-2014]**



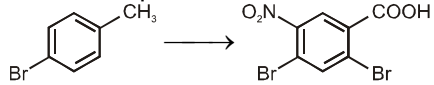
(A) 

(B) 

(C) 

(D) 

35. The best sequence of reactions for the following conversion is **[NSEC-2015]**

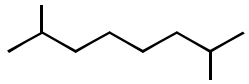
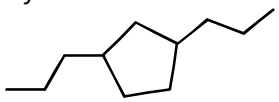
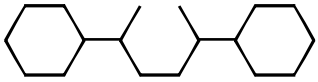
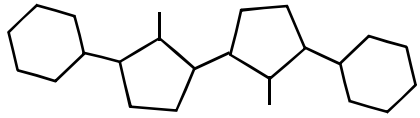


(A) (i) 1 mol Br_2 / $FeBr_3$ (ii) $KMnO_4$, heat (iii) HNO_3+H_2SO_4
(B) (i) HNO_3+H_2SO_4 (ii) 1 mol Br_2 / $FeBr_3$ (iii) $KMnO_4$, heat
(C) (i) $KMnO_4$, heat (ii) HNO_3+H_2SO_4 (iii) 1 mol Br_2 / $FeBr_3$
(D) (i) 1 mol Br_2 / $FeBr_3$ (ii) HNO_3+H_2SO_4 (iii) $KMnO_4$, heat

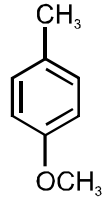
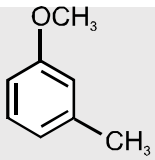
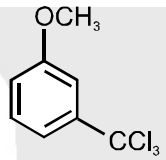
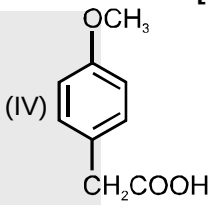
36. 1,3-pentadiene and 1,4-pentadiene are compared with respect to their intrinsic stability and reaction with HI. The correct statement is: **[NSEC-2015]**

(A) 1,3-pentadiene is more stable and more reactive than 1,4-pentadiene
(B) 1,3-pentadiene is less stable and less reactive than 1,4-pentadiene
(C) 1,3-pentadiene is more stable but less reactive than 1,4-pentadiene
(D) 1,3-pentadiene is less stable but more reactive than 1,4-pentadiene

37. The hydrocarbon that cannot be prepared effectively by Wurtz reaction is **[NSEC-2015]**

(A) 
(B) 
(C) 
(D) 

38. The order of reactivity of the following compounds in electrophilic monochlorinatic the most favorable position is **[NSEC-2015]**

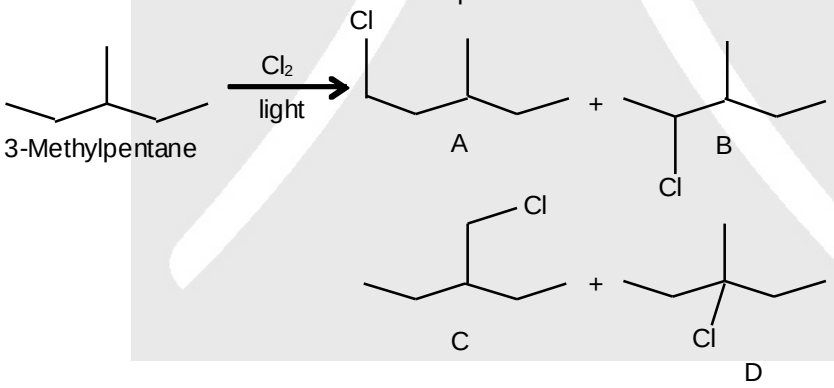
(I) 
(II) 
(III) 
(IV) 

(A) I < II < IV < III (B) III < IV < I < II (C) IV < III < II < I (D) III < II < IV < I

39. The reaction of 1-phenylpropane with limited amount of chlorine in the presence of light gives mainly. **[NSEC-2016]**

(A) 4-chloropropylbenzene (B) 1-chloro-1-phenylpropane
(C) 3-chloro-1-phenylpropane (D) 2-chloro-1-phenylpropane

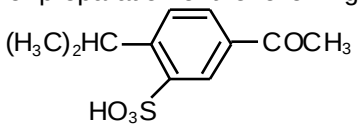
40. 3-Methylpentane on monochlorination gives four possible products. The reaction follows free radical mechanism. The relative reactivities for replacement of –H are 3º : 2º : 1º = 6 : 4 : 1. **[NSEC-2016]**



Relative amounts of A, B, C and D formed are

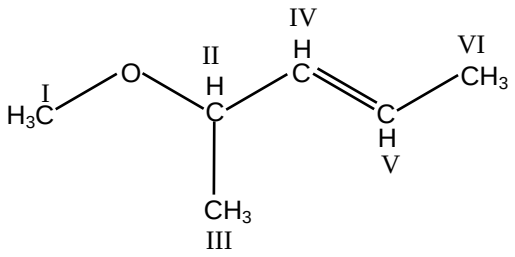
(A) 6/31, 16/31, 6/31, 3/31 (B) 16/31, 6/31, 6/31, 3/31
(C) 6/31, 16/31, 3/31, 6/31 (D) 6/31, 3/31, 6/31, 16/31

41. The best sequence of reactions for preparation of the following compound from benzene is **[NSEC-2016]**



(A) (i) $CH_3COCl/AlCl_3$ (ii) Oleum (iii) $(CH_3)_2CH–Cl$ (1 mole)/$AlCl_3$
(B) (i) $(CH_3)_2CH–Cl$(1 mole)/$AlCl_3$ (ii) $CH_3COCl/AlCl_3$ (iii) Oleum
(C) (i) Oleum (ii) $CH_3COCl/AlCl_3$ (iii) $(CH_3)_2CH–Cl$ (1 mole)/$AlCl_3$
(D) (i) $(CH_3)_2CH–Cl$(1 mole)/$AlCl_3$ (ii) Oleum (iii) $CH_3COCl/AlCl_3$

42. In the given compound the order of case with which hydrogen atom can be abstracted from carbons I to VI is : **[NSEC-2017]**



(A) I > VI > IV = V > I > III
(B) II > I > VI > III > IV = V
(C) II > I > III > VI > IV = V
(D) IV > II > I > III > IV = V

43. Addition of bromine to cis-3-hexene gives **[NSEC-2017]**
(A) racemic dibromide
(B) a mixture of diastereomeric dibromides
(C) optically active dibromide
(D) meso dibromide

PART - III : PRACTICE TEST-2 (IIT-JEE (ADVANCED Pattern))

Max. Time : 1 Hr. **Max. Marks : 66**

Important Instructions

A. General :

1. The test is of 1 hour duration.
2. The Test Booklet consists of 22 questions. The maximum marks are 66.

B. Question Paper Format

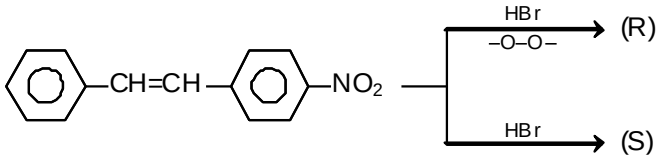
3. Each part consists of five sections.
4. Section-1 contains 8 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE is correct.
5. Section-2 contains 6 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE OR MORE THAN ONE are correct.
6. Section-3 contains 5 questions. The answer to each of the questions is a single-digit integer, ranging from 0 to 9 (both inclusive).
7. Section-5 contains 1 paragraphs each describing theory, experiment and data etc. 2 questions relate to paragraph. Each question pertaining to a partcular passage should have only one correct answer among the four given choices (A), (B), (C) and (D).
8. Section-5 contains 1 multiple choice questions. Question has two lists (list-1 : P, Q, R and S; List-2 : 1, 2, 3 and 4). The options for the correct match are provided as (A), (B), (C) and (D) out of which ONLY ONE is correct.

C. Marking Scheme :

9. For each question in Section-1, 4 and 5 you will be awarded 3 marks if you darken the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.
10. For each question in Section-2, you will be awarded 3 marks. If you darken all the bubble(s) corresponding to the correct answer(s) and zero mark. If no bubbles are darkened. No negative marks will be answered for incorrect answer in this section.
11. For each question in Section-3, you will be awarded 3 marks if you darken only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. No negative marks will be awarded for incorrect answer in this section.

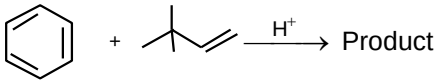
SECTION-1 : (Only One option correct Type)

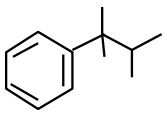
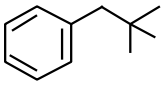
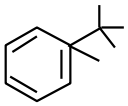
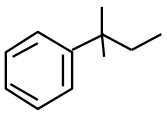
This section contains 8 multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which Only ONE option is correct.

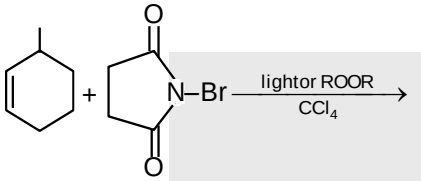
1. 

P & Q are :
(A) Positional isomer (B) Geometrical isomer (C) Optical isomer (D) Chain isomer

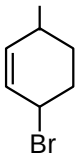
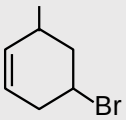
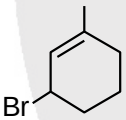
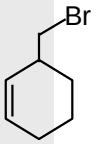
2. What is the product formed in the following reaction.



(A)  (B)  (C)  (D) 

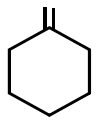
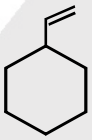
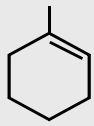
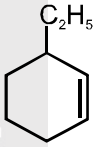
3. 

Major product (A) ; A is :

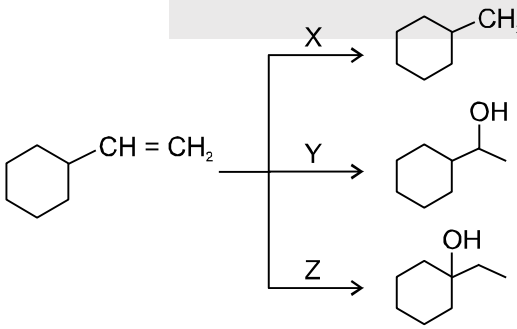
(A)  (B)  (C)  (D) 

4. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y' Thus, 'X' and 'Y' are
(A) X = Benzyl chloride, Y = m-chlorotoluene
(B) X = Benzal chloride, Y = o-chlorotoluene
(C) X = m-chlorotoluene, Y = p-chlorotoluene
(D) X = o- and p-chlorotoluene, Y = Trichloromethyl benzene

5. What is correct order of electrophillic addition of following alkene ?

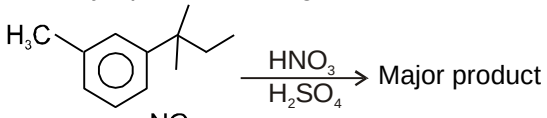
(I)  (II)  (III)  (IV) 

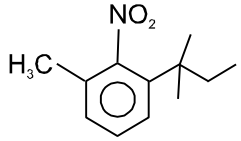
(A) II > IV > I > III (B) IV > III > II > I (C) III > I > IV > II (D) I > II > III > IV

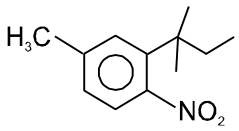
6. 

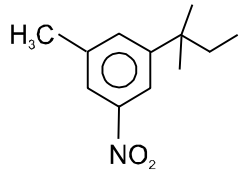
X, Y, Z reaction are :
(A) Simple hydration reaction
(B) Hydroboration oxidation, hydration and oxymercuration demercuration
(C) Hydroboration oxidation, oxymercuration demercuration and hydration
(D) Oxymercuration demercuration, hydroboration oxidation and hydration

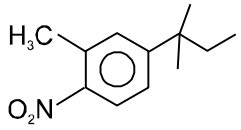
7. The major product of the given reaction is :



(A) 

(B) 

(C) 

(D) 

8. In which reaction incorrect product(s) have been reported.

(A) $CH_2= CH–CHO \xrightarrow{HCl(g)(-10^\circ C)} CH_2 – \underset{Cl}{CH} – CHO$

(B) $CH_2= CH–COOH \xrightarrow{H_2O/H_2SO_4} CH_2 – \underset{OH}{CH} – COOH$

(C) $CH_3 – \overset{CH_3}{\overset{|}{C}} = CH – \underset{O}{\overset{||}{C}} – CH_3 \xrightarrow{CH_3OH/H_2SO_4} CH_3 – \overset{CH_3}{\overset{|}{CH}} – \underset{OCH_3}{\overset{|}{CH}} — \underset{O}{\overset{||}{C}} – CH_3$

(D) $CH_3–CH=CH–OCH_3 \xrightarrow{CH_3OH/H^+} CH_3 – CH_2 – \underset{OCH_3}{\overset{|}{CH}} – OCH_3$

Section-2 : (One or More than one options correct Type)

This section contains 6 multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

9. In the chlorination of Methane which of the following reaction involve in the chain termination step.

(A) $Cl – Cl \longrightarrow 2\,\dot{Cl}$

(B) $\dot{Cl} + \dot{Cl} \longrightarrow Cl–Cl$

(C) $\dot{C}H_3 + \dot{Cl} \longrightarrow CH_3–Cl$

(D) $\dot{C}H_3 + Cl–Cl \longrightarrow CH_3–Cl + \dot{Cl}$

10. Which of the following reactions are completed through free radical intermediate ?

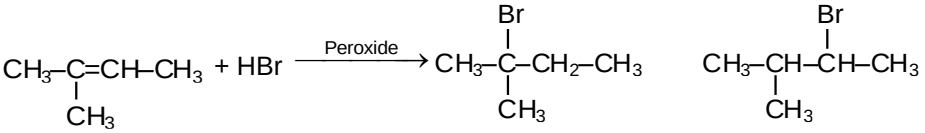
(A) $(CH_3)_3CH + Br_2 \xrightarrow{h\nu} (CH_3)_3CBr + HBr$

(B) $(CH_3)_3C=CH_2 + Br_2 \longrightarrow CH_3–\underset{CH_3}{\overset{Br\ Br}{\overset{|\quad|}{C}}}–CH_2$

(C) $CH_3–CH=CH_2 + Cl_2 \xrightarrow{h\nu} \underset{Cl}{\overset{|}{CH_2}}–CH=CH_2$

(D) $Ph–CH=CH_2 + HBr \xrightarrow[h\nu]{R_2O_2} Ph–CH_2–\underset{Br}{\overset{|}{CH_2}}$

11. Which of the following statements are correct for give reaction.



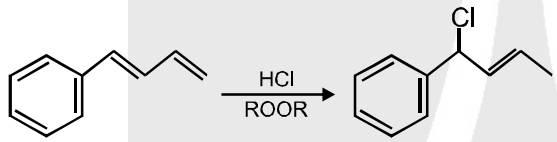
(A) Major product is mixture of two enantiomers.
(B) Less stable carbocation give major product.
(C) Less stable free radical give major product.
(D) More stable free radical give major product.

12. In which of the following reaction reactants and products are correctly matched ?

(A) $F_3C–CH=CH_2 + HCl \longrightarrow F_3C–\underset{\displaystyle Cl}{\underset{|}{CH}}–CH_3$

(B) $CH_3–CH=CH–\overset{\displaystyle O}{\overset{\|}{C}}–OCH_3 + ICl \longrightarrow CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–\underset{\displaystyle I}{\underset{|}{CH}}–\overset{\displaystyle O}{\overset{\|}{C}}–OCH_3$

(C) $C_6H_5CH=CHCH_3 + HBr \xrightarrow{ROOR} C_6H_5CH_2–\underset{\displaystyle Br}{\underset{|}{CH}}–CH_3$

(D) 

13. Which statement is /are correct.
(A) No primary kinetic isotope effect is observed during nitration of benzene
(B) $K_H/K_D = 1$ for halogenation of benzene
(C) $K_H / K_D = 1$ for sulphonation of benzene
(D) K_H/K_D is > 1 for alkylation of benzene

14. Which of the following statements is/are incorrect ?
(A) Nitrobenzene will give meta-nitrotoluene on reaction with $CH_3Cl/AlCl_3$.
(B) Chlorobenzene will give meta-substituted product on electrophilic substitution since it exerts –I > + M effect.
(C) n-Propyl benzene can be easily obtained on Friedal crafts alkylation of benzene with n-propyl chloride.
(D) Toluene can be obtained in better yield when excess of benzene will react with $CH_3Cl/AlCl_3$.

Section-3 : (Single/ Double Integer Value Correct Type.)

This section contains 5 questions. Each question, when worked out will result in one integer from 0 to 9 (both inclusive)

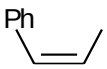
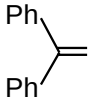
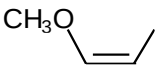
15. How many of the following substituents can cause aromatic electrophilic substitution faster than benzene ?

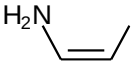
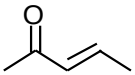
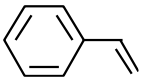
(a) $–NH_2$ (b) $–NR_2$ (c) $–NO_2$ (d) $–\overset{+}{N}H_3$

(e) $–O–\overset{\displaystyle O}{\overset{\|}{C}}–R$ (f) $–NH–\overset{\displaystyle O}{\overset{\|}{C}}–R$ (g) $–\overset{\displaystyle O}{\overset{\|}{C}}–Cl$ (h) $–\overset{\displaystyle O}{\overset{\|}{C}}–H$

(i) $–SO_3H$ (j) $–CH_3$ (k) $–CH=CR_2$

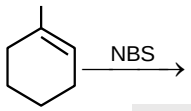
16. How many alkenes react faster than propene with dil.H_2SO_4?

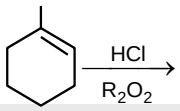
(a)  (b)  (c)  (d) 

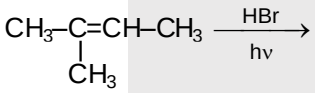
(e)  (f)  (g)  (h) 

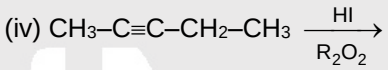
17. When addition of Br_2 was carried out in presence of aq. NaCl on ethene then total number of possible product are :

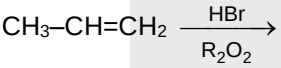
18. How many reactions will proceed through free radical addition mechanism ?

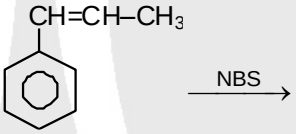
(i) 

(ii) 

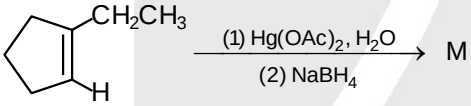
(iii) 

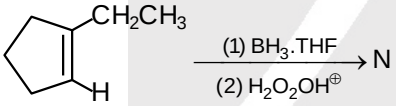
(iv) 

(v) 

(vi) 

19. In the given reactions M is the number of major products obtained in Ist reaction and N number of major products obtained in IInd reaction. Report your answer as MN.

(i) 

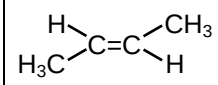
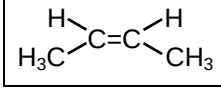
(ii) 

SECTION-4 : Comprehension Type (Only One options correct)

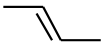
This section contains 1 paragraphs, each describing theory, experiments, data etc. 2 questions relate to the paragraph. Each question has only one correct answer among the four given options (A), (B), (C) and (D)

Paragraph for Question Nos. 20 to 21

Consider experimental data shown in this table :

Alkene	Relative rate	Alkene	Relative rate
$CH_2=CH_2$	1	$(CH_3)_2C=CH_2$	5,400
$CH_2=CH-CH_3$	61	$(CH_3)_2C=CHCH_3$	130,000
	1700	$(CH_3)_2C=C(CH_3)_2$	1,800,000
	2600		

20. Rate of electrophilic addition on isobutylene is significantly higher than cis or trans-2-Butene chiefly due to –

(A) Lesser stability of  (isobutylene) in comparison to  or  .

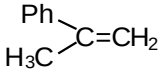
(B) Higher dipole moment of  in comparison to cis or trans-2-Butene.

(C) Better stabilization of positive charge acquired during formation of bromonium ion intermediate by Me-groups

(D) High angle strain in the molecule

21. Which of the following would be expected to have highest rate of electrophilic addition of Br_2 ?

(A) $Ph–CH=CH_2$

(B) 

(C) $Ph–CH=CH–CH_3$

(D) All react with the same rate, since the rate depends only on $[Br_2]$ and not on the substrate.

SECTION-5 : Matching List Type (Only One options correct)

This section contains 1 questions, each having two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (A), (B), (C) and (D) out of which one is correct

22. Match List-I (Compounds) with List-II (% meta electrophilic substitution product) and select the correct answer using the code given below the lists:

	List-I		**List-II**
(P)	$Ar–CH_3$	(1)	64.6
(Q)	$ArCH_2Cl$	(2)	34
(R)	$ArCHCl_2$	(3)	4.5
(S)	$ArCCl_3$	(4)	15

Codes :

	P	Q	R	S		P	Q	R	S
(A)	1	3	2	4	(B)	3	4	2	1
(C)	4	2	3	1	(D)	2	1	3	4

Practice Test-2 ((IIT-JEE (ADVANCED Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.										
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.										
Que.	**21**	**22**								
Ans.										

APSP Answers

PART - I

1.	(4)	**2.**	(3)	**3.**	(4)	**4.**	(1)	**5.**	(2)
6.	(4)	**7.**	(4)	**8.**	(4)	**9.**	(1)	**10.**	(1)
11.	(3)	**12.**	(3)	**3.**	(2)	**14.**	(3)	**15.**	(4)
16.	(2)	**17.**	(2)	**18.**	(4)	**19.**	(2)	**20.**	(3)
21.	(4)	**22.**	(2)	**23.**	(3)	**24.**	(1)	**25.**	(4)
26.	(4)	**27.**	(1)	**28.**	(3)	**29.**	(1)	**30.**	(3)

PART - II

1.	(D)	**2.**	(D)	**3.**	(B)	**4.**	(D)	**5.**	(D)
6.	(B)	**7.**	(D)	**8.**	(C)	**9.**	(C)	**10.**	(D)
11.	(A)	**12.**	(C)	**13.**	(C)	**14.**	(A)	**15.**	(A)
16.	(B)	**17.**	(B)	**18.**	(B)	**19.**	(A)	**20.**	(D)
21.	(B)	**22.**	(A)	**23.**	(D)	**24.**	(C)	**25.**	(D)
26.	(B)	**27.**	(B)	**28.**	(B)	**29.**	(B)	**30.**	(D)
31.	(C)	**32.**	(B)	**33.**	(B)	**34.**	(A)	**35.**	(A)
36.	(A)	**37.**	(B)	**38.**	(B)	**39.**	(B)	**40.**	(C)
41.	(B)	**42.**	(B)	**43.**	(A)				

PART - III

1.	(A)	**2.**	(A)	**3.**	(C)	**4.**	(D)	**5.**	(C)
6.	(C)	**7.**	(D)	**8.**	(C)	**9.**	(BC)	**10.**	(ACD)
11.	(AD)	**12.**	(BCD)	**13.**	(AB)	**14.**	(ABC)		
15.	6 (a, b, e, f, j, k)			**16.**	6 (a, b, c, d, e, g)			**17.**	3
18.	2	**19.**	12	**20.**	(C)	**21.**	(B)	**22.**	(B)

APSP Solutions

PART - I

1. It is allylic substitution reaction.

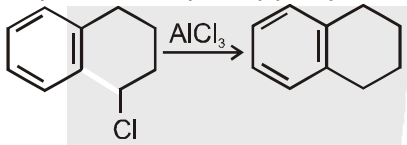
2. Reaction A is free radical addition reaction and all are electrophilic addition reactions.

7. EAS $\propto \frac{1}{EWG}$ on Benzene ring.

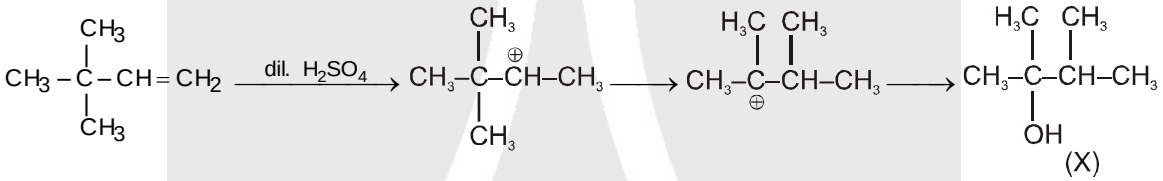
8. In presence of +M effect rate of mononitration increase and in presence of –M effect rate will decreases.

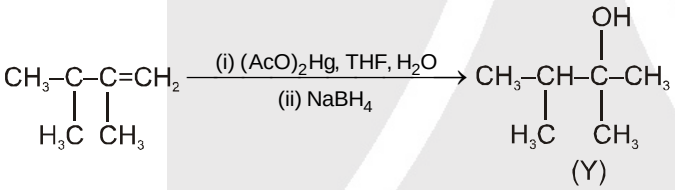
14. As in previous question.

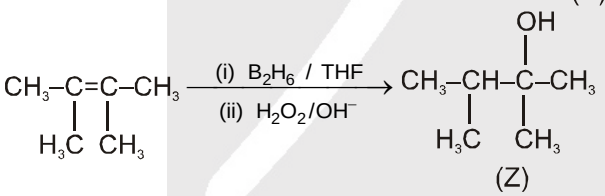
23. Reaction is possible in option (3) only.



25.

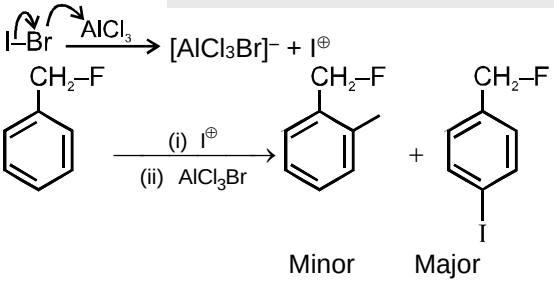






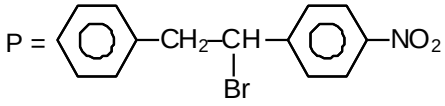
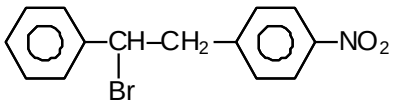
All products are identical.

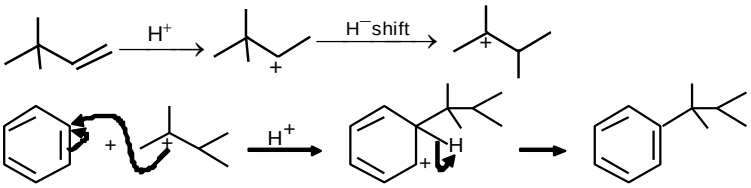
26.



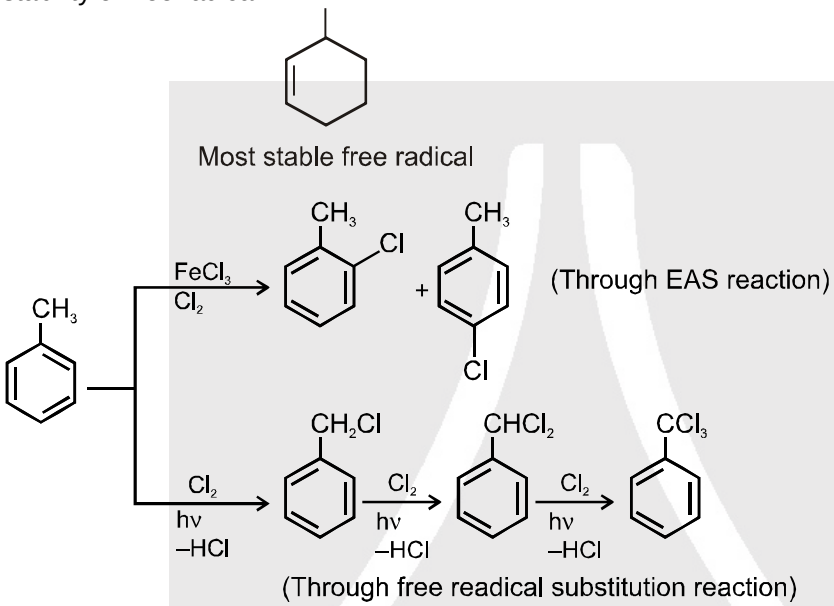
29. In the presence of peroxide, HBr undergoes free radical addition and HCl undergoes electrophilic addition, because of H–Cl bond have high bond energy.

PART - III

1. P =  ; Q = 

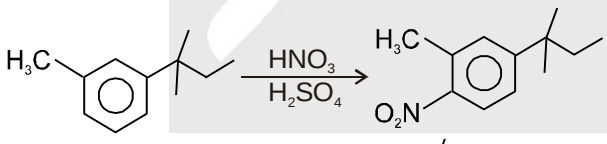
2. 

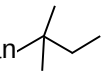
3. The given reaction occur via free radical substitution mechanism. Major product will depend on the stability of free radical.

4. 

5. Electron releasing group and stability of carbocation/halonium ion will decide rate of reaction in electrophilic addition reaction.

6. X = Hydrobroation oxidation, Y = oxymercuration & demercuration, Z = Simple hydration reaction

7. 

–C group is more ring activity than  , para position wrt $-CH_3$ group is more crowded than ortho.

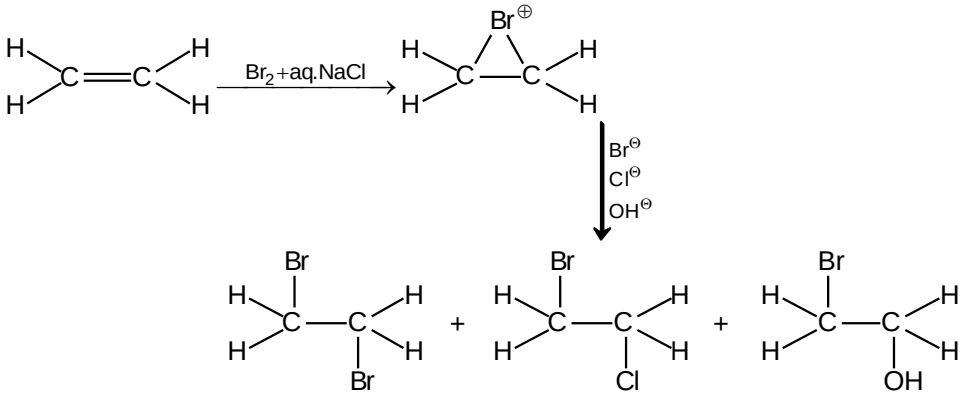
8. The more stable carbocation of alkene gives the major product in electrophilic addition reactions.

9. Option 'D' is chain propagating step.

14. (A) In highly de-activated ring Friedal Crafts reaction is not possible.
(B) Chloro group is ortho-para director.
(C) In Friedal Craft reaction the electrophile carbocation rearranges.
(D) To avoid polyalkylation aromatic substrate is taken in excess.

16. Rate of $E^{\oplus}$ addition $\propto$ stable cation

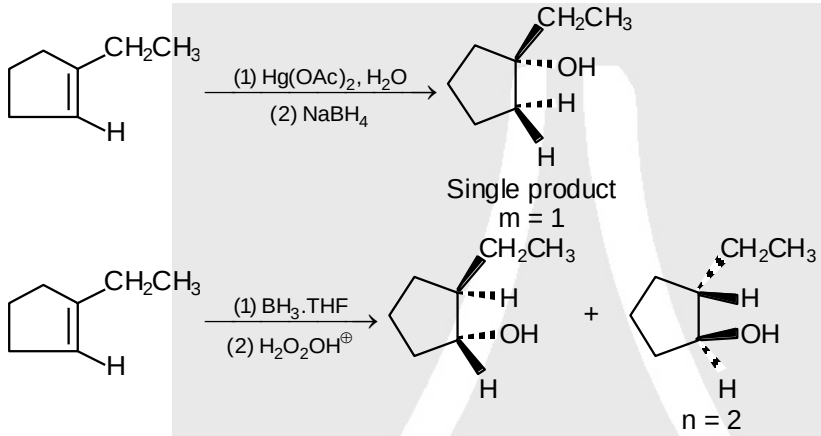
17.



Formation of these three products clearly indicates about formation of cyclic Bromonium ion.

18. Only (iii) & (v)

19.



22. EWG groups are meta directing.