Exercise-1

@ Marked questions are recommended for Revision.

PART - I : SUBJECTIVE QUESTIONS

Section (A) : Unimolecular eliminaiton reaction (E1)

A-1. Why dehydration of alcohol takes place in acidic medium generally but not in basic medium.

A-2. 1º alcohols are poor starting material for synthesis of 1-Alkene. Explain ?

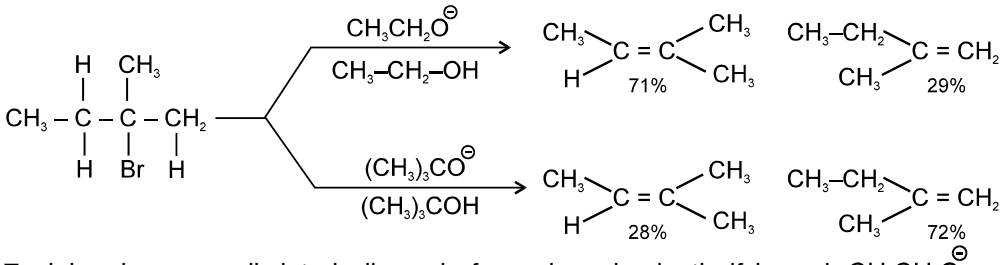
A-3. Predict the major product of the acid catalysed dehydration of the following alcohols :
(a) $(CH_3)_2C(OH)CH_2CH_3$ (b) $CH_3CH_2\,CH_2CH(OH)CH_3$
(c) $(CH_3)_2C(OH)CH(CH_3)_2$ (d) $(CH_3)_3CCH_2OH$

A-4.@ When 1-Bromo-1-methylcyclohexane is heated in ethanol for an extended period of time, three products result: one ether and two alkenes. Predict the products of this reaction, and propose a mechanism for their formation. Also, mention the major elimination product.

Section (B) : Bimolecular elimination reaction (E2)

B-1. A halide with formula $C_6H_{13}I$ is found to give two isomeric alkenes 2-methyl-2-pentene and 4-methyl-2-pentene on dehydrohalogenation with alcoholic KOH. Suggest its structure.

B-2.@



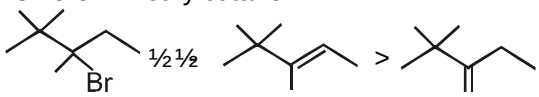
Explain why more alkylated alkene is formed predominatly if base is $CH_3CH_2O^{\ominus}$, while less alkylated alkene is obtained majorly when t-$BuO^{\ominus}$ base is used.

B-3.@ Bromocyclodecane on heating with ethanolic KOH, produces two alkenes. Write the two products also mention the major one.

B-4. Which alkyl chloride would yield following pure alkene on reaction with alcoholic KOH ?

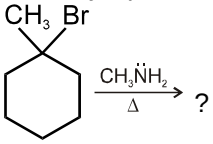
(i) $CH_3 - \underset{\displaystyle CH_3}{\overset{|}{C}} = CH_2$ (ii) $CH_3âCH_2âCH_2âCH=CH_2$ (iii) $CH_3 - CH_2 - \underset{\displaystyle CH_3}{\overset{|}{C}} = CH_2$

B-5. Predict all the alkenes that would be formed by dehydrohalogenation of the following alkyl halides with sodium ethoxide in ethanol and identify the major alkene :
(i) 1-Bromo-1-methylcyclohexane (ii) 2-Chloro-2-methylbutane
(iii) 2, 2, 3-Trimethyl-3-bromopentane. (iii)

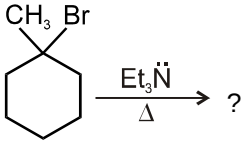


B-6. Give the major products of following reaction :

(a)



(b)

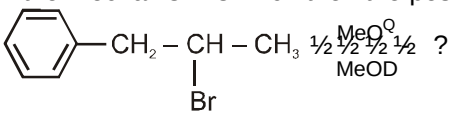


Section (C) : Unimolecular elimination by conjugate base (E1cB)

C-1. What are the essential conditions for any reaction to show E1cB mechanism ?

C-2.@ If ethanol containing EtOD is used as solvent, then deuterium exchange take place in E1cB mechanism. Why ?

C-3. If the mechanism is E1cB then the possible products will be :



PART - II : ONLY ONE OPTION CORRECT TYPE

Section (A) : Unimolecular eliminaiton reaction (E1)

A-1. Which of the following reaction is an example of elimination reaction :

(A) $CH_3CHO \xrightarrow[H_2O]{CH_3MgBr} CH_3-CH(OH)-CH_3$

(B) $CH_3-CH(OH)-CH_3 \xrightarrow[D]{Conc.\ H_2SO_4} CH_3CH=CH_2$

(C) $CH_3CH_2CH_2OH \xrightarrow{PBr_3} CH_3CH_2CH_2Br$

(D) $CH_3CH_2CH_2COOH \xrightarrow{NaNH_2} CH_3CH_2CH_2COONa + NH_3$

A-2. Correct statement for E1 Reaction is :

(A) It is a two step process. (B) Rearrangement is possible.
(C) Good leaving group favours (D) All of these

A-3. Intermediate formed during E1 reaction is

(A) Carbocation (B) Carbanion (C) Free radical (D) Carbene

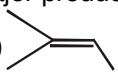
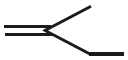
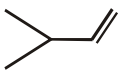
A-4. $CH_3CH(CH_3)CH(Cl)CH_3 \xrightarrow{EtOH/D}$ Major elimination product X.

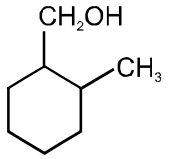
X is

(A) $CH_3CH(CH_3)CH_2CH_3$ (B) $CH_3C(CH_3)=CHCH_3$ (C) $C_2H_5C(CH_3)=CH_2$ (D) $CH_3CH_2C(CH_3)_3$

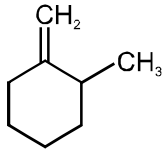
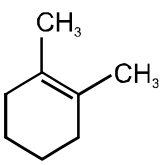
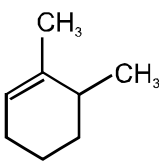
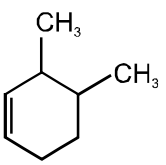
A-5. $CH_3-C(CH_3)(OH)-CH_2-CH_3 \xrightarrow[D]{Conc.\ H_2SO_4}$ Major Product

Major product is :

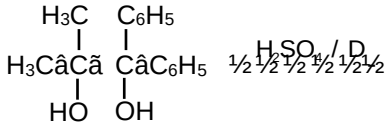
(A)  (B)  (C)  (D) 

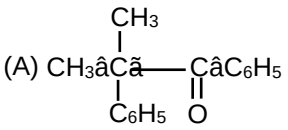
A-6. In the given reaction :  $\xrightarrow{Conc.\ H_2SO_4}$ [X] as major product

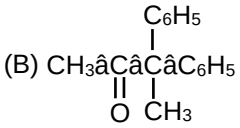
[X] will be :

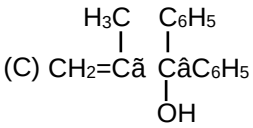
(A)  (B)  (C)  (D) 

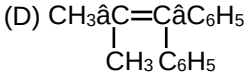
A-7.@ Identify the major product formed in the following reaction



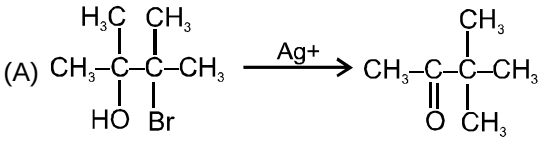
(A) 

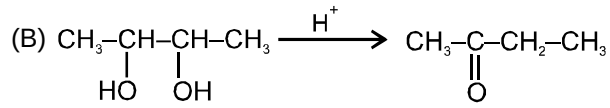
(B) 

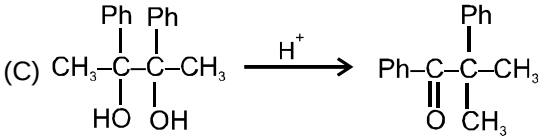
(C) 

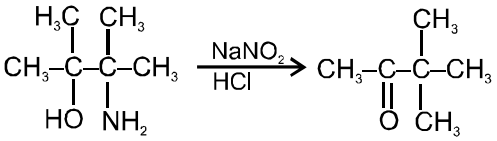
(D) 

A-8. Which of the following does not representing the correct product

(A) 

(B) 

(C) 

(D) 

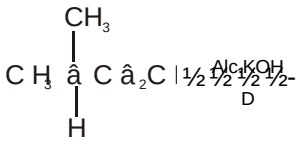
Section (B) : Bimolecular elimination reaction (E2)

B-1.@ Correct statement for E2 Reaction is :

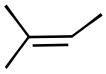
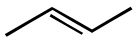
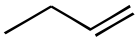
(A) It is a two step process.
(B) It is an unimolecular reaction
(C) Strong base favours
(D) Carbanion is formed during the reaction

B-2.@ Intermediate of E2 reaction is â

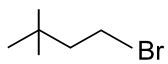
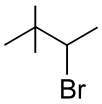
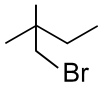
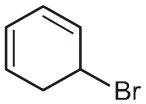
(A) Carbocation
(B) Carbanion
(C) Free radical
(D) Intermediate is not Formed

B-3.  Alkene ,

Alkene is â

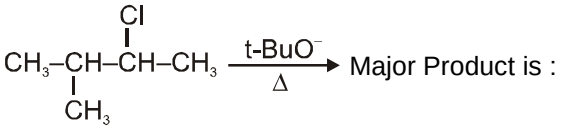
(A) 
(B) 
(C) 
(D) 

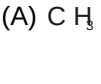
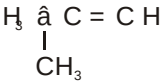
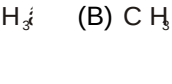
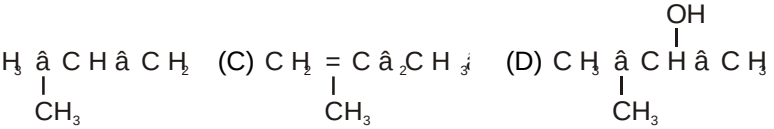
B-4. Which of the following cannot undergo E2 reaction ?

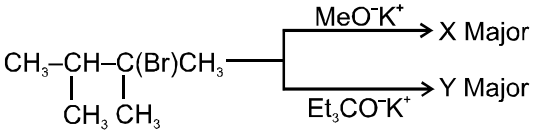
(A) 
(B) 
(C) 
(D) 

B-5. 2-Chlorobutane on treatment with alcoholic KOH/D gives major product :

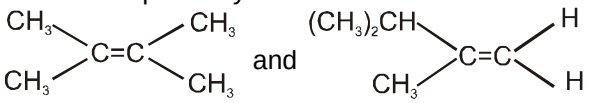
(A) 2-Butene (B) 1-Butene (C) 2-Butanol (D) 1-Butyne

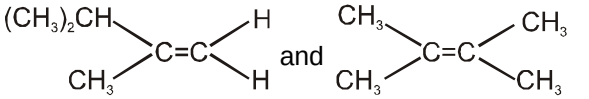
B-6.  Major Product is :

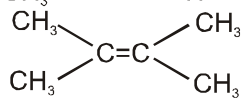
(A)  (B)  (C)  (D) 

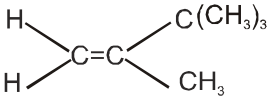
B-7. 

X and Y are respectively :

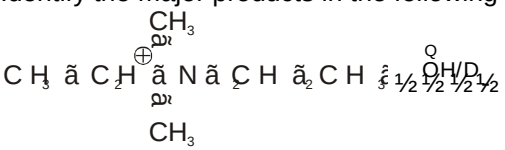
(A) 

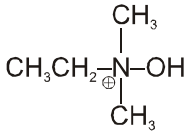
(B) 

(C) Both 

(D) Both 

B-8.@ Identify the major products in the following reaction ?



(A) CH_3âCH=CH_2 (B) CH_2= CH_2 (C)  (D) C_2H_5âOH

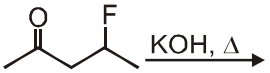
Section (C) : Unimolecular elimination by conjugate base (E1cB)

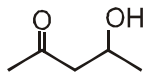
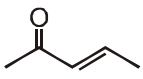
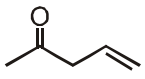
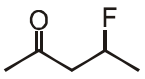
C-1. Reaction intermediate of E1cB reaction is :

(A) Carbocation (B) Carbanion (C) Benzyne (D) Free radical

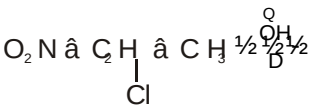
C-2. D-exchange is observed in :

(A) E1 (B) E2 (C) E1cB (D) none of these

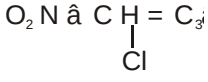
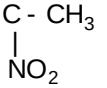
C-3.@  Major Product is :

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

C-4. Major product of given reaction is-

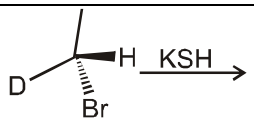
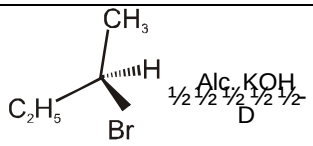
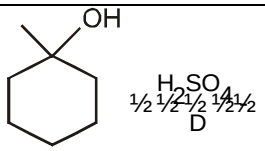
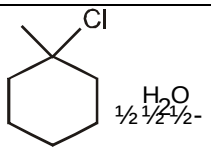
 Major product

(A) O_2NâCH=CHâCH$_3$ (B) O_2NâCH$_2$âCH=CH_2

(C)  (D) 

PART - III : MATCH THE COLUMN

1.@ Match List I (Reaction) with List II (Type of reaction) and select the correct answer using the code given below the lists :

	List I		**List II**
(P)		(1)	S_N1
(Q)		(2)	S_N2
(R)		(3)	E1
(S)		(4)	E2

Codes :

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

2. Match reactions written in **List-I** with their mechanism in **List-II**.

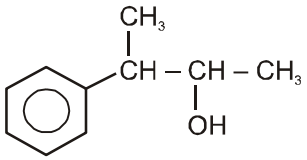
	List-I		**List-II**
(A)	$PhâCH_2âCH_2â Br \xrightarrow{aq.\ KOH} Ph–\underset{\displaystyle OH}{\underset{|}{CH}}–CH_3 + PhâCH=CH_2$	(p)	S_N1
(B)	$PhâCH_2âCH_2âBr \xrightarrow[\Delta]{EtONa} PhâCH_2âCH_2âOEt + PhâCH=CH_2$	(q)	S_N2
(C)	$PhâCH_2âCH_2âBr \xrightarrow[\Delta]{\ddot{E}tO/EtOD} PhâCH=CH_2$	(r)	E_1
(D)	$PhâCH_2âCH_2âBr \xrightarrow[\Delta]{\ddot{E}tO/EtOD} PhâCH=CH_2 + PhâCD_2âCH_2Br$	(s)	E_2
		(t)	E1cB

Exercise-2

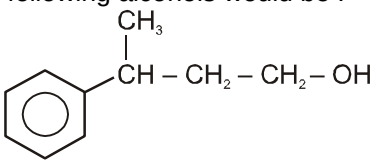
@ Marked questions are recommended for Revision.

PART - I : ONLY ONE OPTION CORRECT TYPE

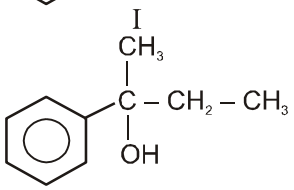
1.@ The relative rate of acid catalysed dehydration of following alcohols would be :



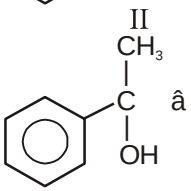
I



II



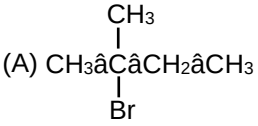
III



IV

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

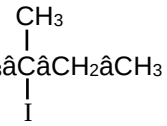
2. Which one of the following compound undergoes E1 reaction most readily ?



(A) $CH_3-C(Br)(CH_3)-CH_2-CH_3$

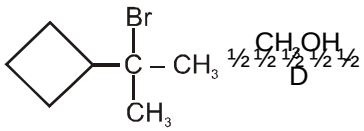
(B) $CH_3-CH_2-CH_2-Br$

(C) $CH_3-CH_2-CH_2-I$



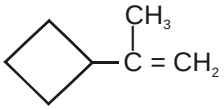
(D) $CH_3-C(I)(CH_3)-CH_2-CH_3$

3. In the given reaction,

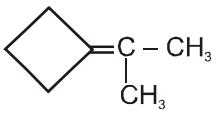


[X] as the major product among the elimination products is :

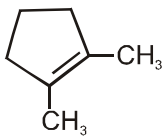
(A)



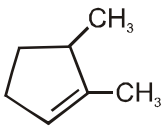
(B)



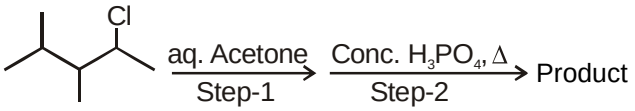
(C)



(D)



4.@

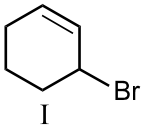


Intermediates for both the steps are respectively ?

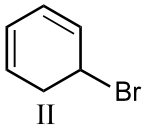
(A) Carbocation & No intermediate (B) No intermediate & carbocation

(C) Carbocation & carbanion (D) Carbocation & carbocation

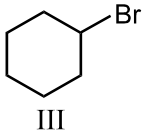
5. Arrange the following in decreasing order of stability of their transition state during elimination by strong base



I



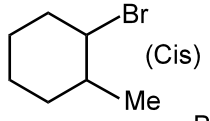
II

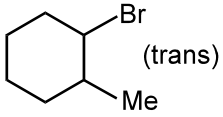


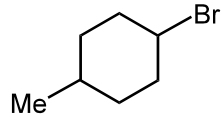
III

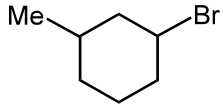
(A) II > I > III (B) II > III > I (C) I > III > II (D) I > II > III

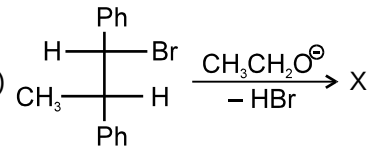
6.@ Which of the following will undergo fastest elimination reaction with alcoholic KOH.

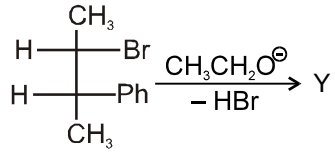
(A) 

(B) 

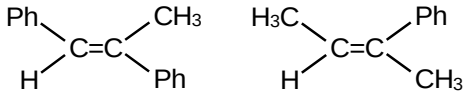
(C) 

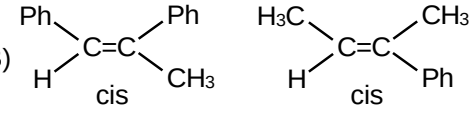
(D) 

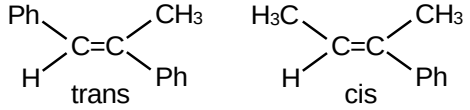
7.@ (a) 

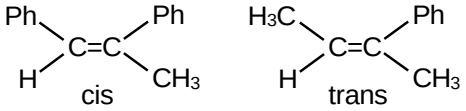
(b) 

Identify the product of the following elimination reaction X and Y respectively with stereochemistry :

(A) 

(B) 

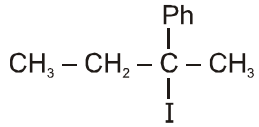
(C) 

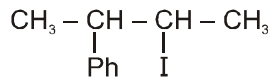
(D) 

8.@ Which mechanism has different reactivity order of alkyl halides (1º, 2º, 3º) than others :

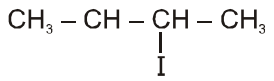
(A) S_N1 (B) S_N2 (C) E1 (D) E2

9.@ The correct order of S_N2 / E2 ratio for the % yield of product of the following halide is :

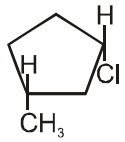
(P) 

(Q) 

(R) CH3 â CH2 â I

(S) 

(A) R > S > Q > P (B) R > Q > S > P (C) P > R > S > Q (D) Q > P > R > S

10. 

½½½½½½½½½½½½ (1) NaOH (Aprotic solvent) ½½½½½½½½½½½½ (2) PBr3 ½½½½½½½½½½½½ (3) KOH DMSO ½½½½½½½½½½½½ (4) SOCl2 ½½½½½½½½½½½½ (II) Product

(I) (Reactant)

In this reaction I and II are,

(A) Enantiomers (B) Structure isomers

(C) Geometrical isomers (D) Identical compounds

11.@ Select the incorrect option for the following statements.

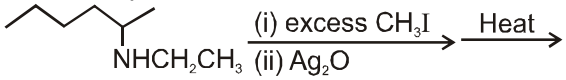
(A) Bimolecular elimination of alkyl halides is a stereospecific reaction.

(B) In S_N2 reaction a single isomer is the only product.

(C) Alcohol dehydrate in strongly basic conditions by E1 mechanism.

(D) 3-hydroxypropanal dehydrates in strong basic condition by E1cb mechanism.

12. Predict the possible number of alkenes and the main alkene in the following reaction.



(A) 2 and 

(B) 2 and 

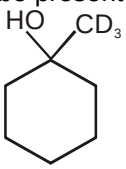
(C) 4 and $H_2C=CH_2$

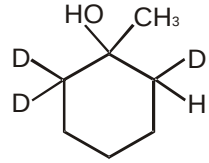
(D) 3 and $H_2C=CH_2$

PART - II : SINGLE AND DOUBLE VALUE INTEGER TYPE

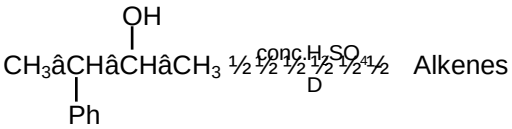
1. æXç is a smallest optically active alkanol. On deh stereoisomers). On reaction with Lucas reagent it forms Z number of alkyl halides (including stereoisomers). Report your answer as | Z | Y |.

2. If the starting material is labelled with deuterium as indicated, predict how many total deuterium atoms will be present in the major elimination product ?

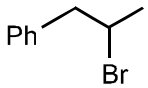
(a)  ½½½½½½½ $\xrightarrow[D]{\text{Conc. } H_2SO_4}$

(b)  ½½½½½½½ $\xrightarrow[D]{\text{Conc. } H_2SO_4}$

3.@ The total number of alkenes possible by dehydrobromination of 3-bromo-3-methylhexane using alcoholic KOH is :

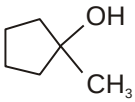
4. In the given reaction :  Alkenes

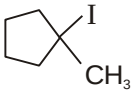
Total number of alkenes (Including stereo isomers) formed will be

5.  ½½½½½½ $\xrightarrow[D]{\text{Alc. KOH}}$ Alkenes

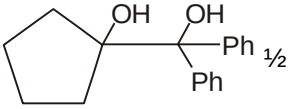
the total number of possible alkenes in this elimination reaction is.

6.@ The difference of molecular weights of the major products P and Q form at the followng reactions is

(i)  + CH_3I ½½½½½ $\xrightarrow{KOH/D}$ P (organic product)

(ii)  + CH_3CH_2OH ½½½½½ $\xrightarrow{KOH/D}$ Q (organic product)

7. Observe the following reaction sequence

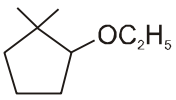
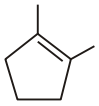
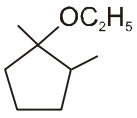
 ½½½½½½½½½ $\xrightarrow[(1)]{\text{Conc. } H_2SO_4 \text{ (boil)}}$ (G) ½½½½½ $\xrightarrow[(2)]{LiAlH_4}$ (H) ½½½½½½ $\xrightarrow[(3)]{H_3PO_4, D}$ (I)

Calculate molecular mass [W] of product I and report your answer as N , where N = W · 3.

PART - III : ONE OR MORE THAN ONE OPTIONS CORRECT TYPE

1.@ Predict the products expected in given reaction

2-Bromo-1,1-dimethylcycopentane ½½½½½ $\xrightarrow[D]{C_2H_5OH}$

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

2. Which of the following order is/are correct for the rate of E2 reaction ?

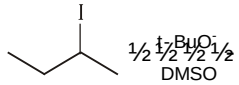
(A) 5-Bromocycloheptene > 4-Bromocycloheptene

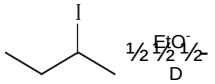
(B) 2-Bromo-1-phenylbutane > 3-Bromo-1-phenylbutane

(C) 3-Bromocyclohexene > Bromocyclohexane

(D) 3-Bromo-2-methylpentane > 2-Bromo-4-methylpentane

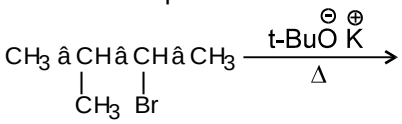
3.@ Which of the following statement (s) is/are true about the following eliminations ?

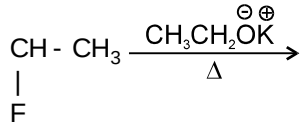
(I) 

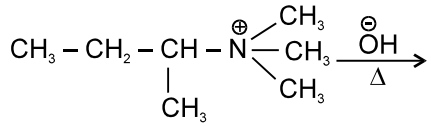
(II) 

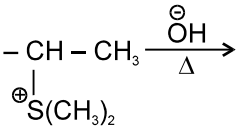
(A) Hoffmann product is major product in I.
(B) Saytzeff product is major product in I
(C) Hoffmann product is major product in II.
(D) Saytzeff product is major product in II

4.@ In which reaction product formation takes place by Hoffmann rule ?

(A) 

(B) 

(C) 

(D) 

5. Which of the following compounds can give E1cB reaction ?

(A) $CF_3âCHCl_2$

(B) $C_6H_5 â CHâ CH_2F$ with NO_2 on CH

(C) $CH_3âCH_2âCH_2Br$

(D) $C_6H_5 â CHâCH_2âCHO$ with OH on CH

6.@ Which of the following statement (s) is/are correct

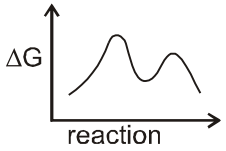
(A) E2 is a concerted reaction in which bonds break and new bonds form at the same time in a single step.

(B) Order of reactivity of alkyl halides towards E2 dehydrohalogenation is found to be $3^o > 2^o > 1^o$

(C) In E2 reaction both b hydrogen and leaving group should be antiperiplanar.

(D) In E2 elimination different stereoisomer (diastereomer) converts into different stereo product.

7. Following graph between DG and reaction progress in for/can be :



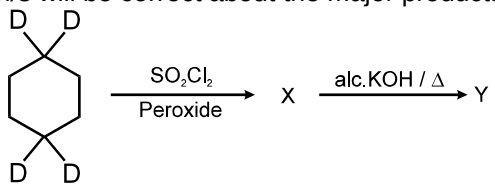
(A) S_N1 reaction

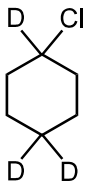
(B) E_1 reaction

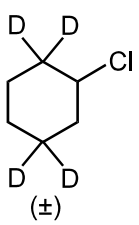
(C) Aromatic electrophilic substitution

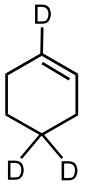
(D) Electrophilic addition reaction

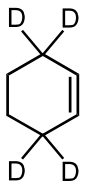
8.@ Which observation/s will be correct about the major products X and Y of the following reaction.



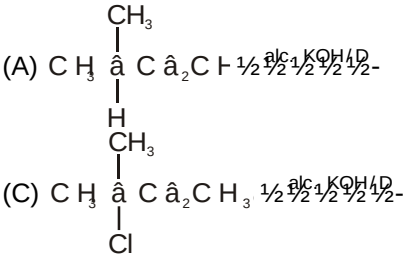
(A) X is 

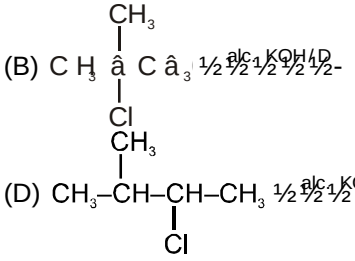
(B) X is 

(C) Y is 

(D) Y is 

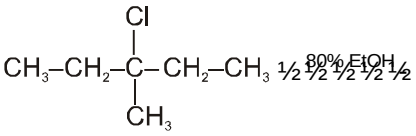
9.@ In which of the following reaction, regioselectivity can be observed.

(A) 

(B) 

(C)

(D)

10.@ 

What is / are true about above reaction ?

(A) Major product is given by S_N1 reaction.

(B) Through E1 mechanism 3 alkenes are formed.

(C) 3-Methylpentan-3-ol is also formed as one of the product.

(D) Fractional distillation of elimination products will give two fractions.

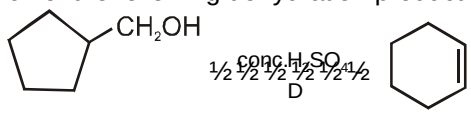
PART - IV : COMPREHENSION

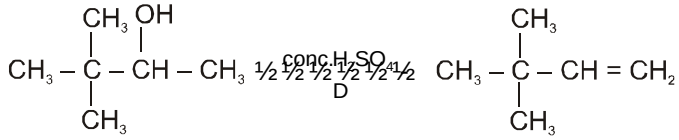
Read the following passage carefully and answer the questions.

Comprehension # 1

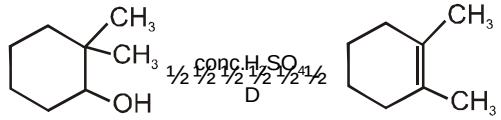
Alcohols undergo acid catalysed elimination reactions to produce alkenes. Because water is lost in the elimination, this reaction is called dehydration reaction. Secondary and tertiary alcohols always give E1 reaction in dehydration. Primary alcohols whose b-carbon is branched also give E1 reaction. The reactivity of alcohol for elimination reaction is tertiary alcohol > Secondary alcohol > Primary alcohol.

1. Which of the following dehydration product (major) is incorrect ?

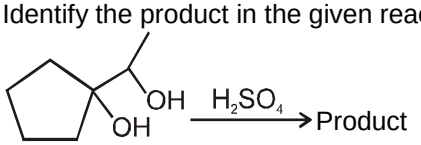
(A) 

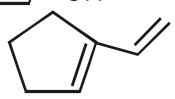
(B) 

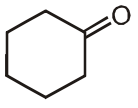
(C) $CH_3CH_2CH_2CH_2OH \xrightarrow[D]{conc.H_2SO_4} CH_3–CH=CH–CH_3$

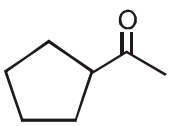
(D) 

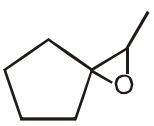
2.@ Identify the product in the given reaction :



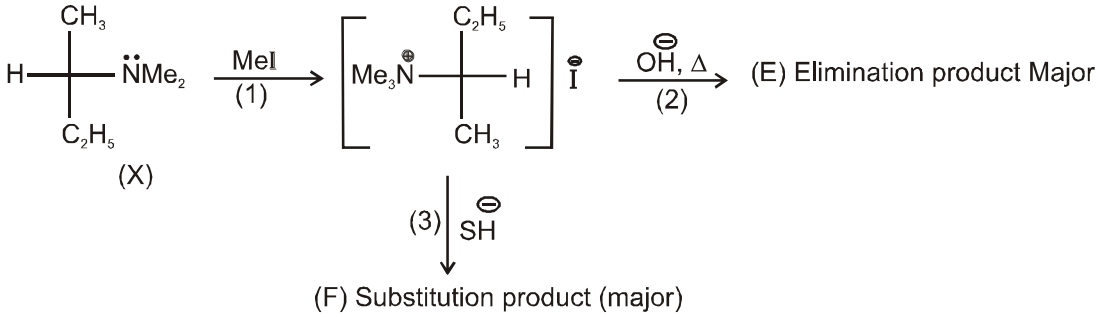
(A) 

(B) 

(C) 

(D) 

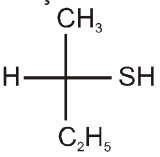
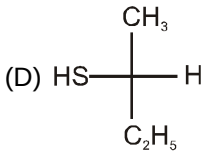
Comprehension # 2



3. The incorrect statement about step-1 is :
(A) It is S_N2 reaction
(B) Only one transition state is formed in this reaction
(C) Walden inversion has occured at reactant (X)
(D) The reaction has molecularity two

4. The product (E) is
(A) $CH_3-CH_2-CH=CH_2$ (B) $CH_3-CH=CH-CH_3$ (C) $CH_2=CH_2$ (D) $CH_3-CH=CH_2$

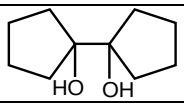
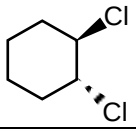
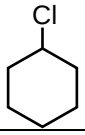
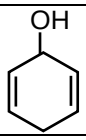
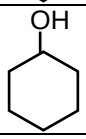
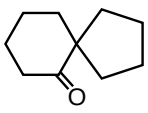
5. The product (F) is

(A) C_2H_5SH (B)  (C) CH_3SH (D) 

Comprehension # 3

Answer Q.6, Q.7 and Q.8 by appropriately matching the information given in the three columns of the following table.

Observe the three columns in which column-1 represents reactants, column-2 represents reaction conditions while column-3 represents products.

Column-1		Column-2		Column-3	
(I)		(i)	Zn dust / D	(P)	
(II)		(ii)	Conc. H_2SO_4	(Q)	
(III)		(iii)	$HCl/ZnCl_2$	(R)	
(IV)		(iv)	Aqueous $AgNO_3$	(S)	

6. The bimolecular reaction is represented by :
(A) (IV), (iii), (Q) (B) (I), (ii), (S) (C) (III), (ii), (P) (D) (II), (i), (R)

7. The dehydration reaction is represented by :
(A) (III), (ii), (R) (B) (III), (iv), (P) (C) (I), (ii), (S) (D) (IV), (iii), (R)

8. The unimolecular nucleophilic substitution is represented by :
(A) (II), (iii), (Q) (B) (I) (iv), (S) (C) (IV), (iv), (Q) (D) (IV), (iii), (Q)

Exercise-3

*** Marked Questions may have more than one correct option.**

PART - I : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. Identify (X), (Y) and (Z) in the following synthetic scheme and write their structures. Explain the formation of labelled formaldehyde (H_2C^*O) as one of the products when compound (Z) is treated with HBr and subsequently ozonolysed. Mark the C* carbon in the entire scheme.

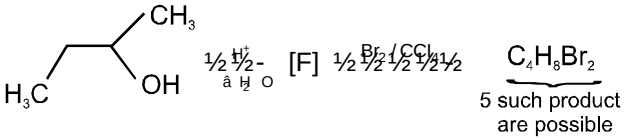
$Ba\overset{*}{C}O_3 + H_2SO_4 \rightarrow$ (X) gas [C* denotes C^{14}]

$CH_2=CH-Br \xrightarrow[\text{(ii) X}]{\text{(i) Mg / ether}} \underset{\text{(iii) } H_3O^+}{\text{(Y)}} \xrightarrow{LiAlH_4}$ (Z) **[IIT-JEE 2001(M), 5/135]**

2. Identify the set of reagents / reaction conditions æX

$CH_3-CH_2-CH_2Br \xrightarrow{X}$ product $\xrightarrow{Y}$ $CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$ **[IIT-JEE 2002(S), 3/150]**

(A) X = concentrated alcoholic NaOH, 80°C; Y = HBr acetic acid, 20°C
(B) X = dil. aq. NaOH, 20°C, Y = HBr / acetic acid, 20°C
(C) X = dil. aq. NaOH, 20°C, Y = Br_2 / $CHCl_3$, 0°C
(D) X = conc. alc. NaOH, 80°C, Y = Br_2 / $CHCl_3$, 0°C

3. 

How many structures of F is possible? **[IIT-JEE 2003(S), 4/144]**
(A) 2 (B) 5 (C) 6 (D) 3

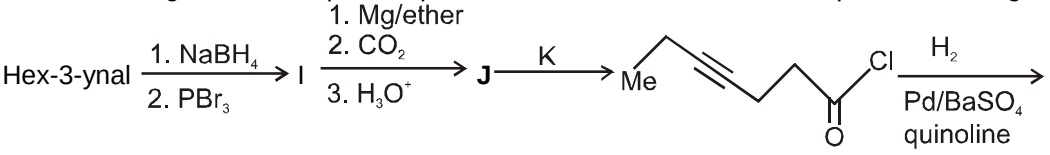
4. Which is the best reagent to convert cyclohexanol into cyclohexene. **[JEE-2005, 3/144]**
(A) conc. HCl (B) conc. HBr (C) conc. H_3PO_4 (D) HCl + $ZnCl_2$

5. Match the following (one term in column-I may match with more than one terms in column-II) **[JEE-2006, 6/184]**

	Column I		**Column II**
(A)	$CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$ on reaction with $C_2H_5O^-$ gives $CH_2=CH-CD_3$	(p)	The reaction is E1
(B)	$PhCH_2CH_2Br$ gives elimination faster than $PhCD_2CH_2Br$. The mechanism is	(q)	The reaction is E2
(C)	$PhCH_2CH_2Br$ in presence of $C_2H_5OD/C_2H_5O^-$ gives good yield of $PhCD_2CH_2Br$ along with alkene	(r)	The reaction is E1 cB
(D)	$Ph-\underset{\underset{Br}{|}}{CH}-CD_3$ and $Ph-\underset{\underset{Br}{|}}{CH}-CH_3$ on elimination, yield alkene at the same rate	(s)	The reaction is unimolecular

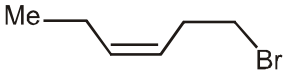
Comprehension # 1

In the following reaction sequence, product I , **J** and **L** are formed. **K** represents a reagent.

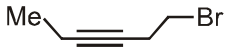


6. The structure of the product I is **[IIT-JEE 2008, 4/162]**

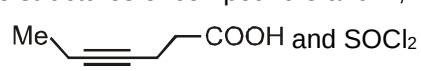
(A) 

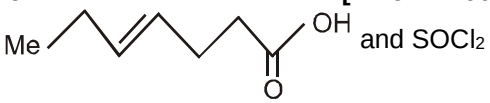
(B) 

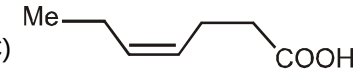
(C) 

(D) 

7. The structures of compound **J** and **K**, respectively, are **[IIT-JEE 2008, 4/162]**

(A) 

(B) 

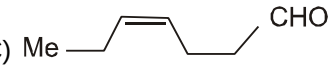
(C) 

(D) 

8. The structure of product **L** is **[IIT-JEE 2008, 4/162]**

(A) 

(B) 

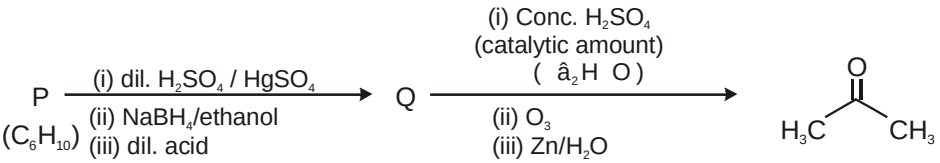
(C) 

(D) 

9. The total number of alkenes possible by dehydrobromination of 3-bromo-3-cyclopentylhexane using alcoholic KOH is **[JEE-2011, 4/160]**

Comprehension # 2

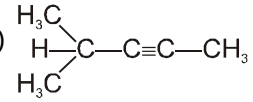
An acyclic hydrocarbon **P**, having molecular formula C_6H_{10}, gave acetone as the only organic product through the following sequence of reactions, in which Q is an intermediate organic compound.

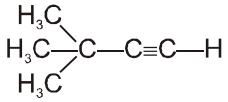


10. The structure of compound **P** is **[JEE 2011, 3/160]**

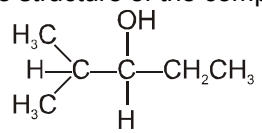
(A) $CH_3CH_2CH_2CH_2âC^1 CâH$

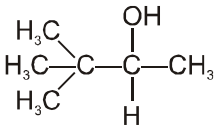
(B) $H_3CH_2CâC^1 CâCH_2CH_3$

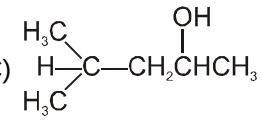
(C) 

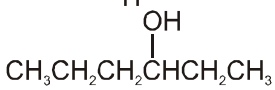
(D) 

11. The structure of the compound **Q** is **[JEE 2011, 3/160]**

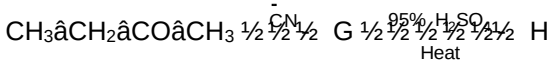
(A) 

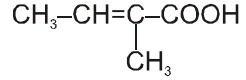
(B) 

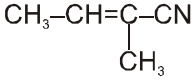
(C) 

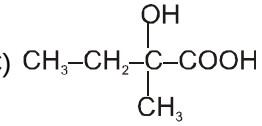
(D) 

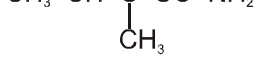
12. The major product (H) in the given reaction sequence is : **[IIT-JEE 2012, 3/136]**



(A) 

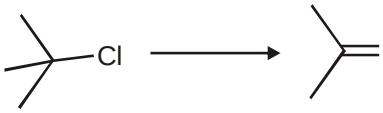
(B) 

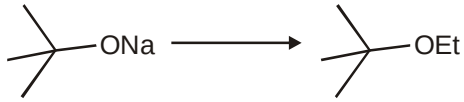
(C) 

(D) 

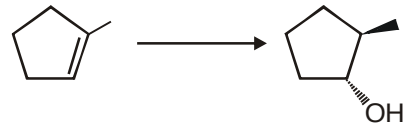
13. Match the chemical conversions in List I with the appropriate reagents in List II and select the correct answer using the code given below the lists : **[IIT-JEE-2013, 3/120]**

List I

P. 

Q. 

R. 

S. 

List II

1. (i) $Hg(OAc)_2$; (ii) $NaBH_4$

2. NaOEt

3. Et-Br

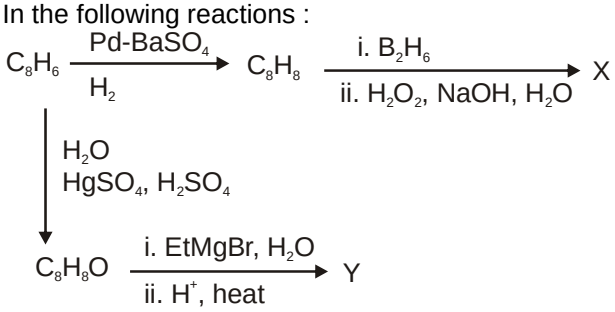
4. (i) BH_3 ; (ii) H_2O_2/NaOH

Codes :

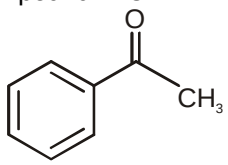
	P	Q	R	S		P	Q	R	S
(A)	2	3	1	4	(B)	3	2	1	4
(C)	2	3	4	1	(D)	3	2	4	1

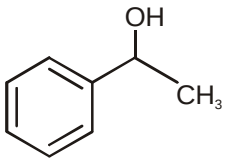
Comprehension # 3

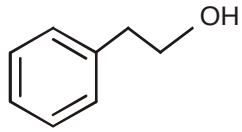
In the following reactions :

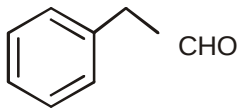


14. Compound X is **[IIT-JEE-2015, 4/168]**

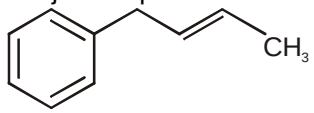
(A) 

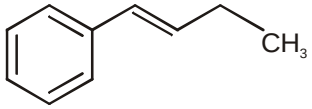
(B) 

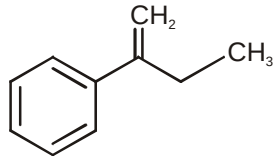
(C) 

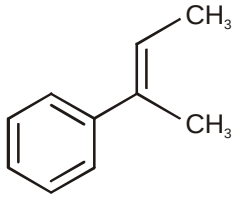
(D) 

15. The major compound Y is **[IIT-JEE-2015, 4/168]**

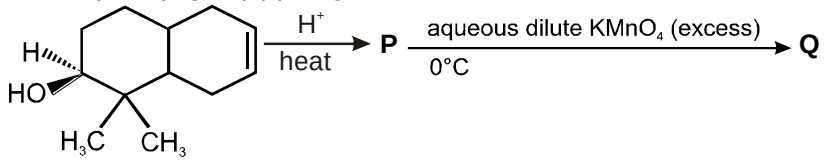
(A) 

(B) 

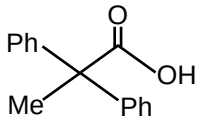
(C) 

(D) 

16. The number of hydroxyl group(s) in **Q** is : **[IIT-JEE-2015, 4/168]**

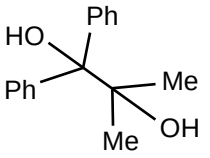


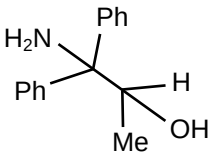
17. The desired product **X** can be prepared by reacting the major product of the reactions in LIST-I with one or more appropriate reagents in LIST-II. (Given, order of migratory aptitude: aryl > alkyl > hydrogen)
[JEE(Advanced) 2018, 3/120]

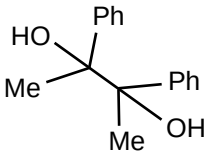


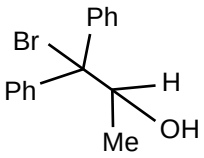
X

LIST-I **LIST-II**

(P)  + H_2SO_4

(Q)  + HNO_2

(R)  + H_2SO_4

(S)  + $AgNO_3$

(1) I_2, NaOH

(2) $[Ag(NH_3)_2]OH$

(3) Fehling solution

(4) HCHO, NaOH

(5) NaOBr

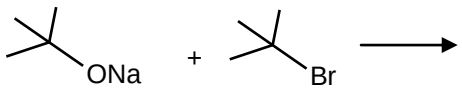
The correct option is

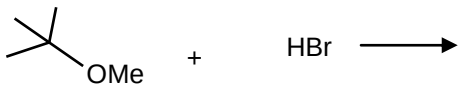
(A) P - 1 ; Q - 2, 3 ; R - 1, 4 ; S - 2, 4 (B) P - 1, 5 ; Q - 3, 4 ; R - 4, 5 ; S - 3

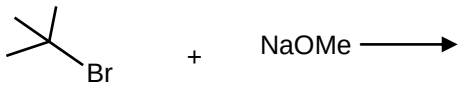
(C) P - 1, 5 ; Q - 3, 4 ; R - 5 ; S - 2, 4 (D) P - 1, 5 ; Q - 2, 3 ; R - 1, 5 ; S - 2, 3

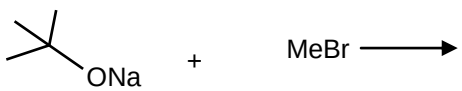
18. LIST-I contains reactions and LIST-II contains major products. **[JEE(Advanced) 2018, 3/120]**

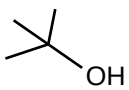
LIST-I **LIST-II**

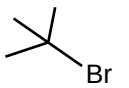
(P) 

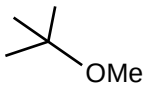
(Q) 

(R) 

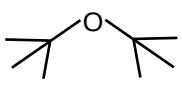
(S) 

(1) 

(2) 

(3) 

(4) 

(5) 

Match each reaction in LIST-I with one or more products in LIST-II and choose the correct option.

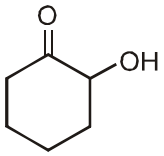
(A) P - 1, 5 ; Q - 2 ; R - 3 ; S - 4 (B) P - 1, 4 ; Q - 2 ; R - 4 ; S - 3

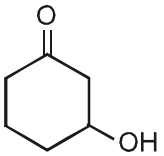
(C) P - 1, 4 ; Q - 1, 2 ; R - 3, 4 ; S - 4 (D) P - 4, 5 ; Q - 4 ; R - 4 ; S - 3, 4

PART - II : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

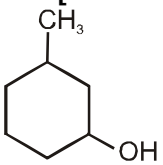
JEE(MAIN) OFFLINE PROBLEMS

1. Maximum dehydration takes place that of : **[AIEEE-2002, 3/225]**

(1) 

(2) 

(3) 

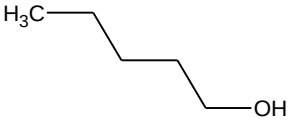
(4) 

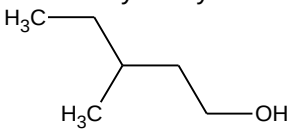
2. During dehydration of alcohols to alkenes by heating with concentrated H_2SO_4 the initation step is

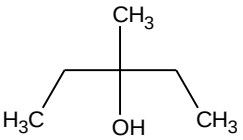
(1) Protonation of alcohol molecule (2) Formation of carbocation **[AIEEE-2003, 3/225]**

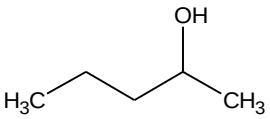
(3) Elimination of water (4) Formation of an ester

3. Among the following compounds which can be dehydrated very easily : **[AIEEE-2004, 3/225]**

(1) 

(2) 

(3) 

(4) 

4. Elimination of HBr from 2-bromobutane result in the formation of : **[AIEEE-2005, 3/225]**

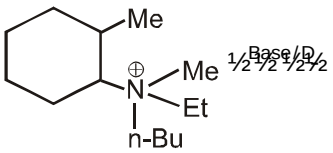
(1) Predominantly 2-butyne (2) Predominantly 1-butene

(3) Predominantly 2-butene (4) Equimolar mixture of 1 and 2-butene

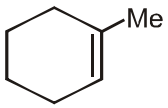
5. Reaction of trans 2-phenyl-1-bromocyclopentane on reaction with alcoholic KOH produces: **[AIEEE-2006, 3/165]**

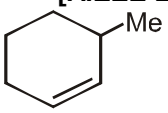
(1) 2-phenylcyclopentene (2) 1-phenylcyclopentene

(3) 3-phenylcyclopentene (4) 4-phenylcyclopentene

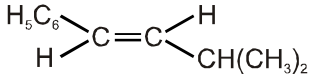
6. 

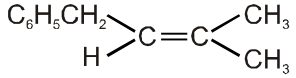
The alkene formed as a major product in the above elimination reaction is : **[AIEEE-2006, 3/165]**

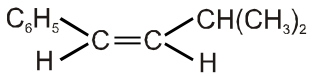
(1)  (2) $CH_2=CH_2$ (3) 

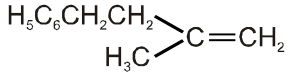
(4) 

7. The main product of the following reaction is, $C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{conc. } H_2SO_4}$

(1) 

(2)  **[AIEEE-2010, 4/144]**

(3) 

(4) 

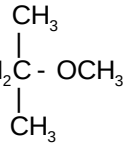
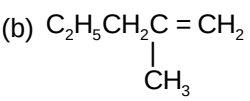
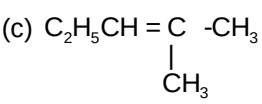
8. Consider the following reaction: $C_2H_5OH + H_2SO_4$ - Product
Among the following, which one cannot be formed as a product under any conditions ?
[JEE(Main) 2011, 4/120]

(1) Ethylene (2) Acetylene (3) Diethyl ether (4) Ethyl-hydrogen sulphate

9. In the reaction, $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{Alc.\ KOH} C$,
the product C is : **[JEE(Main) 2014, 4/120]**

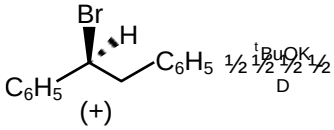
(1) Acetaldehyde (2) Acetylene (3) Ethylene (4) Acetyl chloride

10. 2-Chloro-2-methylpentane on reaction with sodium methoxide in methanol yields :
[JEE(Main) 2016, 4/120]

(a)  (b)  (c) 

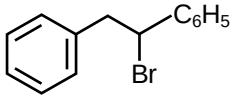
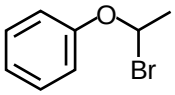
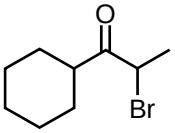
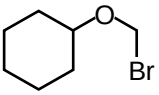
(1) (a) and (c) (2) (c) only (3) (a) and (b) (4) All of these

11. The major product obtained in the following reaction is : **[JEE(Main) 2017, 4/120]**

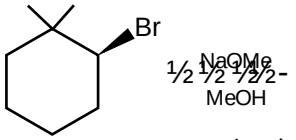


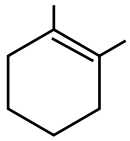
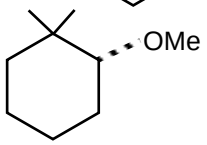
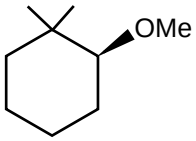
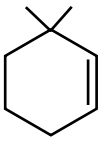
(1) $C_6H_5CH{=}CHC_6H_5$ (2) $(+)C_6H_5CH(O^tBu)CH_2C_6H_5$
(3) (â)$C_6H_5CH(O^tBu)CH_2C_6H_5$ (4) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$

12. Which of the following, upon treatment with tert-BuONa followed by addition of bromine water, fails to decolourize the colour of bromine ? **[JEE(Main) 2017, 4/120]**

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

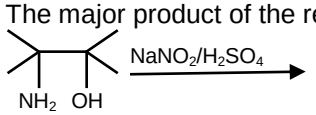
13. The major product of the following reaction is : **[JEE(Main) 2018, 4/120]**

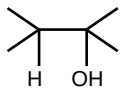
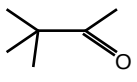
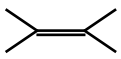
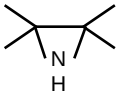


(1)  (2)  (3)  (4) 

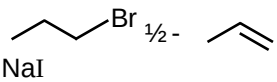
JEE(MAIN) ONLINE PROBLEMS

1. The major product of the reaction

 is :
[JEE(Main) 2014 Online (09-04-14), 4/120]

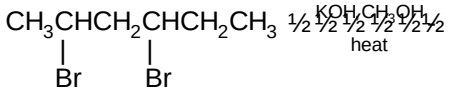
(1)  (2)  (3)  (4) 

2. Which one of the following reagents is not suitable for the elimination reaction ?
[JEE(Main) 2016 Online (10-04-16), 4/120]



(1) NaI (2) NaOH / H_2O-EtOH
(3) NaOH / H_2O (4) NaOEt / EtOH

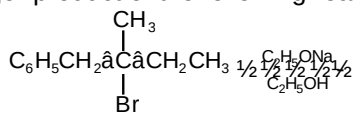
3. The major product of the following reaction is : **[JEE(Main) 2017 Online (08-04-17), 4/120]**

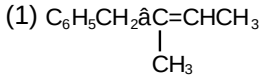


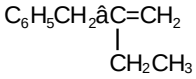
(1) $CH_3CH=C=CHCH_2CH_3$ (2) $CH_2=CHCH=CHCH_2CH_3$

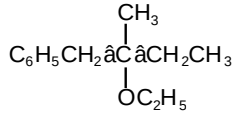
(3) $CH_3CH=CH–CH=CHCH_3$ (4) $CH_2=CHCH_2CH=CHCH_3$

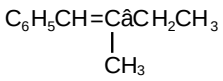
4. The major product of the following reaction is : **[JEE(Main) 2017 Online (08-04-17), 4/120]**



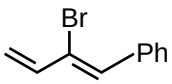
(1) 

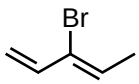
(2) 

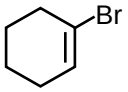
(3) 

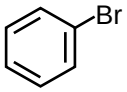
(4) 

5. Which of the following will most readily give the dehydrohalogenation product ? **[JEE(Main) 2018 Online (15-04-18), 4/120]**

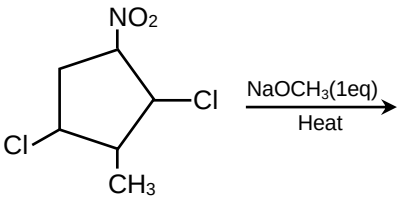
(1) 

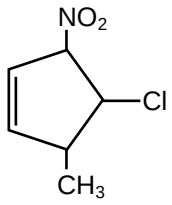
(2) 

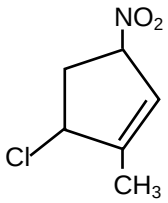
(3) 

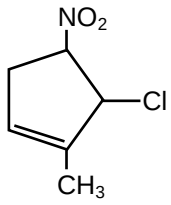
(4) 

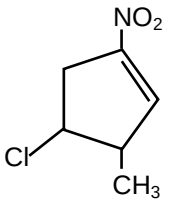
6. The major product formed in the following reaction is : **[JEE(Main) 2018 Online (15-04-18), 4/120]**



(1) 

(2) 

(3) 

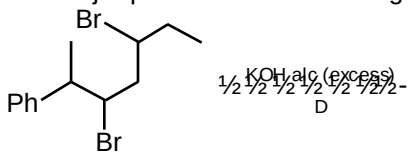
(4) 

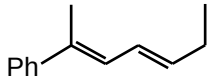
7. Which of the following compounds will most readily be dehydrated to give alkene under acidic condition? **[JEE(Main) 2018 Online (16-04-18), 4/120]**

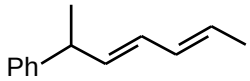
(1) 4-Hydroxypentan-2-one (2) 3-Hydroxypentan-2-one

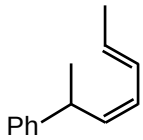
(3) 1-Pentanol (4) 2-Hydroxycyclopentanone

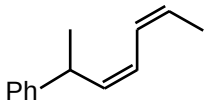
8. The major product of the following reaction is : **[JEE(Main) 2019 Online (10-01-19), 4/120]**



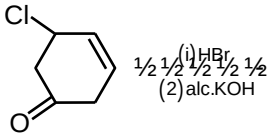
(1) 

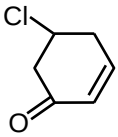
(2) 

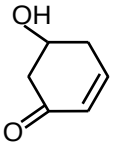
(3) 

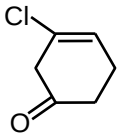
(4) 

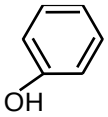
9. The major product of the following reaction is **[JEE(Main) 2019 Online (11-01-19), 4/120]**



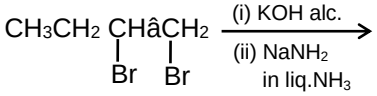
(1) 

(2) 

(3) 

(4) 

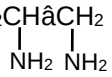
10. The major product of the following reaction is : **[JEE(Main) 2019 Online (12-01-19), 4/120]**



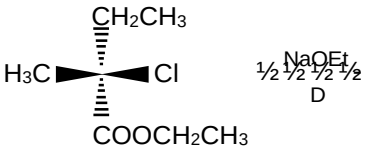
(1) $CH_3CH=C=CH_2$

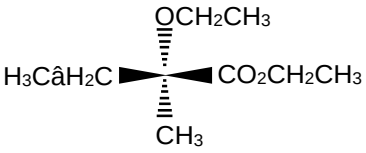
(2) $CH_3CH=CHCH_2NH_2$

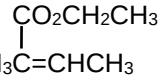
(3) $CH_3CH_2C^{1}CH$

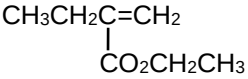
(4) 

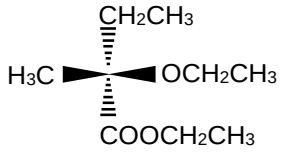
11. The major product of the following reaction is: **[JEE(Main) 2019 Online (12-01-19), 4/120]**



(1) 

(2) 

(3) 

(4) 

Answers

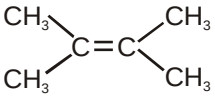
EXERCISE â 1

PART - I

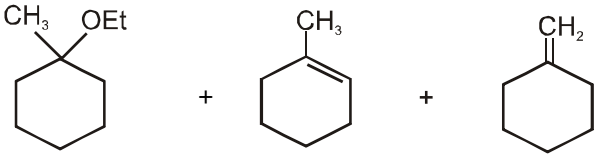
A-1. In basic condition very poor leaving group âOH will eliminate but in acidic medium âOH will be converted into $\hat{a}\overset{\ddot{}}{O}H_2$ which is very good leaving group.

A-2. 1º carbocation $R\hat{a}\overset{\ddot{}}{C}H_2$ would rearrange and 2-alkene would result. Even if 1-alkene is also formed but, it would tend to rearrange in acidic medium to 2-alkene.

A-3. (a) $CH_3-\overset{CH_3}{\overset{|}{C}}=CHCH_3$ (b) $CH_3\hat{a}CH_2\hat{a}CH=CH\hat{a}CH_3$

(c)  (d) $CH_3-\overset{CH_3}{\overset{|}{C}}=CHCH_3$

A-4.

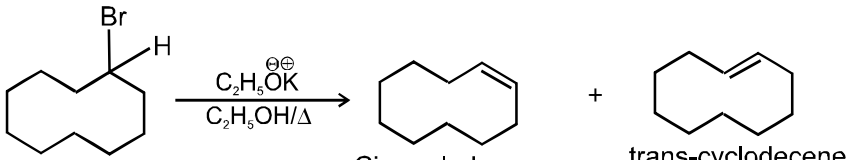


ether substitution product | Major | Minor (Elimination products)

B-1. $CH_3-\underset{CH_3}{CH}-\underset{I}{CH}-CH_2-CH_3$

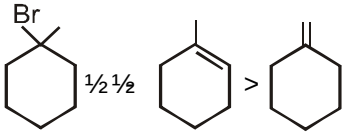
B-2. t-$BuO^{\ominus}$ is bulky base so Hoffmann product is formed as major product.

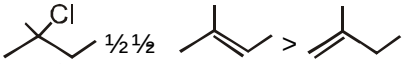
B-3.

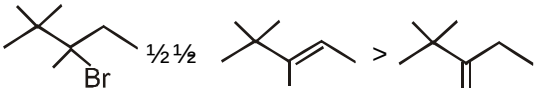


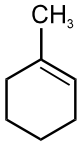
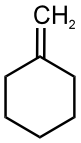
Cis-cyclodecene (major) 85% | trans-cyclodecene 15%

B-4. (i) $CH_3-\underset{Cl}{\overset{CH_3}{\overset{|}{CH}}}-CH_2$ or $CH_3-\underset{Cl}{\overset{CH_3}{\overset{|}{C}}}-CH_3$; (ii) $CH_3CH_2CH_2CH_2CH_2Cl$; (iii) $CH_3CH_2\underset{CH_3}{\overset{|}{C}}HCH_2Cl$

B-5. (i) 

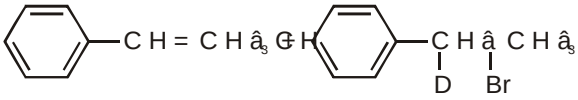
(ii) 

(iii) 

B-6. (a)  (b) 

C-1. The compound must have acidic b-hydrogen and a relatively poor leaving group.

C-2. In E1cB mechanism carbanion is formed as intermediate and 1st step is reversible.

C-3. 

PART - II

A-1.	(B)	**A-2.**	(D)	**A-3.**	(A)	**A-4.**	(B)	**A-5.**	(A)
A-6.	(B)	**A-7.**	(B)	**A-8.**	(C)	**B-1.**	(C)	**B-2.**	(D)
B-3.	(A)	**B-4.**	(C)	**B-5.**	(A)	**B-6.**	(B)	**B-7.**	(A)
B-8.	(B)	**C-1.**	(B)	**C-2.**	(C)	**C-3.**	(B)	**C-4.**	(A)

PART - III

1. (B) **2.** (A - p,r) ; (B - q,s) ; (C - s) ; (D - t)

EXERCISE â 2

PART - I

1.	(D)	**2.**	(D)	**3.**	(C)	**4.**	(D)	**5.**	(A)
6.	(A)	**7.**	(C)	**8.**	(B)	**9.**	(A)	**10.**	(C)
11.	(C)	**12.**	(C)						

PART - II

1.	23	**2.**	6	**3.**	5	**4.**	5	**5.**	3
6.	32 [Molecular Weights (P â Q) = 114 â 82 = 32]					**7.**	78		

PART â III

1.	(ABCD)	**2.**	(BCD)	**3.**	(AD)	**4.**	(ABCD)	**5.**	(ABD)
6.	(ABCD)	**7.**	(ABCD)	**8.**	(BD)	**9.**	(CD)	**10.**	(ABC)

PART - IV

1.	(B)	**2.**	(C)	**3.**	(C)	**4.**	(A)	**5.**	(C)
6.	(D)	**7.**	(C)	**8.**	(D)				

EXERCISE â 3

PART - I

1. (X) = $\overset{*}{C}O_2$; (Y) = $CH_2=CH-\overset{*}{\underset{\underset{O}{\|}}{C}}-O-H$; (Z) = $CH_2=CH-\overset{*}{C}H_2$ $\ominus OH$ H_2O **2.** (A)

3.	(D)	**4.**	(C)	**5.**	(A) - q ; (B) - q ; (C) - r, s ; (D) - p, s			**6.**	(D)
7.	(A)	**8.**	(C)	**9.**	5	**10.**	(D)	**11.**	(B)
12.	(A)	**13.**	(A)	**14.**	(C)	**15.**	(D)	**16.**	(4)
17.	(D)	**18.**	(B)						

PART - II

JEE(MAIN) OFFLINE PROBLEMS

1.	(2)	**2.**	(1)	**3.**	(3)	**4.**	(3)	**5.**	(3)
6.	(2)	**7.**	(1)	**8.**	(2)	**9.**	(3)	**10.**	(4)
11.	(1)	**12.**	(4)	**13.**	(4)				

JEE(MAIN) ONLINE PROBLEMS

1.	(2)	**2.**	(1)	**3.**	(3)	**4.**	(4)	**5.**	(1)
6.	(4)	**7.**	(1)	**8.**	(1)	**9.**	(4)	**10.**	(3)
11.	(2)								