Exercise-1

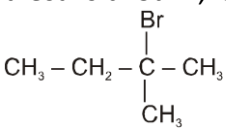
Marked Questions may have for Revision Questions.

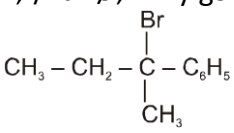
OBJECTIVE QUESTIONS

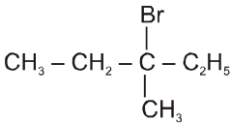
Section (A) : Unimolecular elimination (E1) reaction of alkyl halides

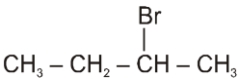
A-1. Elimination reaction generally occurs with the formation of :
(1) One sigma bond (2*) one pi bond (3) one sigma and one pi bond (4) None of the above

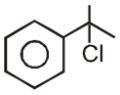
A-2. Which one of the following compound is most reactive for E1 reaction ?
fuEu esa ls dkSulk ;kSfxd E1 vfHkfØ;kvks ds izfr vR;f/kd fØ;k'khy gS\

(1) 

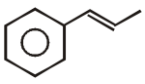
(2*) 

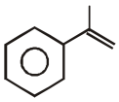
(3) 

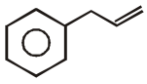
(4) 

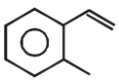
A-3.  $\xrightarrow{EtOH/\Delta}$ P (Major elimination product)

P is (P gS)

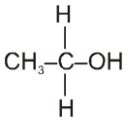
(1) 

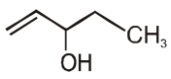
(2*) 

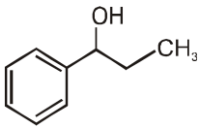
(3) 

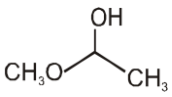
(4) 

A-4. Substrate that readily do not show E1 reaction

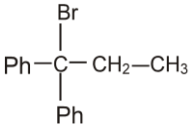
(1*) 

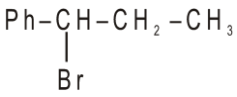
(2) 

(3) 

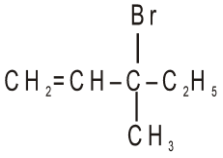
(4) 

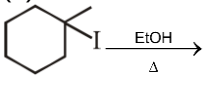
A-5. Which one the following will be the most reactive for E1 reaction

(1*) 

(2) 

(3) Br–CH=CH–CH_2–CH_3

(4) 

A-6.  P (Major elimination product)

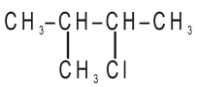
P is -

(1) 

(2*) 

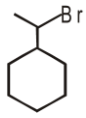
(3) 

(4) 

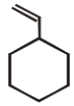
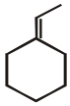
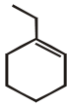
A-7.  $\xrightarrow{EtOH/\Delta}$ Major elimination product X.

X is :

(1) $CH_3-\underset{CH_3}{\underset{|}{CH}}-CH=CH_2$ (2*) $CH_3-\underset{CH_3}{\underset{|}{C}}=CH-CH_3$ (3) $CH_3-\underset{C_2H_5}{\underset{|}{C}}=CH_2$ (4) $CH_3-\underset{CH_3}{\underset{|}{C}}=\underset{CH_3}{\underset{|}{C}}-CH_3$

A-8  ⟶ Major elimination product X.

X is :

(i)  (ii)  (iii)  (iv) 

(1) i & ii (2) ii & iv (3*) ii & iii (4) iii & iv

Section (B) : Bimolecular elimination (E2) reaction of Alkyl halide

B-1. Which of the following reaction is an elimination reaction ?

(1) $CH_3-CH_2-CH_2-OH \xrightarrow{PCl_5} CH_3-CH_2-CH_2-Cl$

(2) $CH_3-CH=CH_2 \xrightarrow{HCl} CH_3-\underset{Cl}{\underset{|}{CH}}-CH_3$

(3*) $CH_3-\underset{Cl}{\underset{|}{CH}}-CH_3 \xrightarrow{Alc.KOH} CH_3-CH=CH_2$

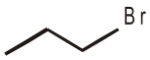
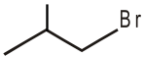
(4) $CH_3-\underset{O}{\underset{||}{C}}-OH \xrightarrow[H^+]{CH_3OH} CH_3-\underset{O}{\underset{||}{C}}-OCH_3$

B-2. Select the correct reactivity order of dehydrohelogenation reaction for the following halides with alcoholic KOH.

(i) $CH_3CH_2CH_2CH_2-Br$ (ii) $CH_3-CH(Br)-CH(CH_3)_2$ (iii) $CH_3-CH(Br)-CH_2Ph$

(1) i > ii > iii (2) i > iii > ii (3*) iii > ii > i (4) ii > iii > i

B-3. Most reactive alkyl halide towards E2 reaction is –

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

B-4. Rate of bimolecular elimination for the following compound is :

(a) $Ph-\underset{Cl}{\underset{|}{CH}}-CH_2-CH_3$ (b) $CH_3-CH_2-\underset{CH_3}{\underset{|}{\overset{Cl}{\overset{|}{C}}}}-CH_3$ (c) $CH_3-\underset{Cl}{\underset{|}{CH}}-CH_3$ (d) $CH_3-\underset{Cl}{\underset{|}{CH}}-CH_2-CH_3$

(1) a > b > c > d (2) a > d > b > c (3*) a > b > d > c (4) c > d > b > a

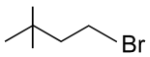
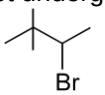
B-5. Most reactive alkyl halide towards E2 mechanism is :

(1) $(CH_3)_3\,C-CH_2Br$

(2*) $(CH_3)_2CH-\underset{Br}{\underset{|}{CH}}-CH_3$ / $(CH_3)_3C-\underset{C(CH_3)_3}{\underset{|}{CH}}-CH_2Br$

(3) $(CH_3)_3C-CH_2CH_2Br$ (4)

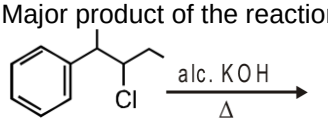
B-6. Which of the following cannot undergo E2 reaction ?

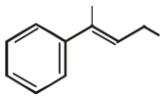
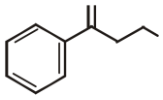
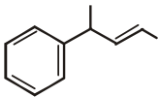
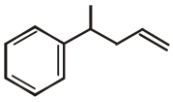
(1)  (2)  (3*)  (4) none of these

B-7. A mixture of 1-chlorobutane and 2-chlorobutane when treated with alcoholic KOH gives -

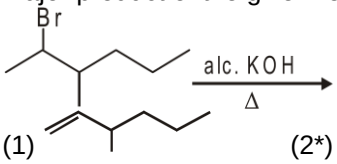
(1) 1-Butene only (2) 2-Butene only (3) Isobutylene (4*) Mixture of 1-butene + 2-butene

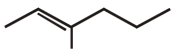
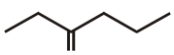
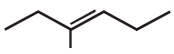
B-8. Major product of the reaction given below is :



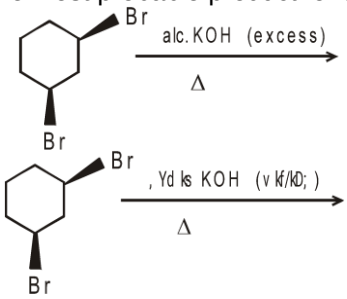
(1*)  (2)  (3)  (4) 

B-9. Major product of the given reaction is :



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

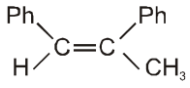
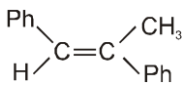
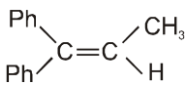
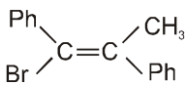
B-10. The most probable product for the following reaction is :

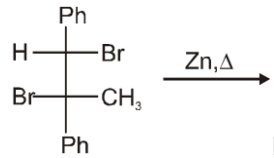


(1*)  (2)  (3)  (4) 

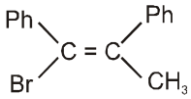
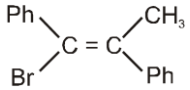
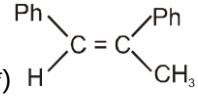
B-11. 

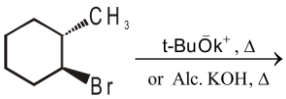
major product is :

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

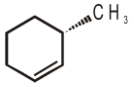
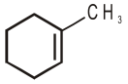
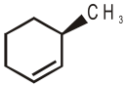
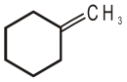
B-12. 

Product is :

(1)  (2)  (3*)  (4) Ph–C≡C–CH_2–Ph

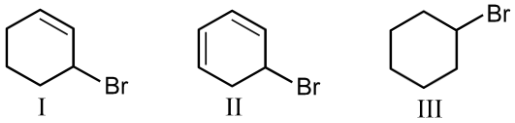
B-13. 

porduct is :

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

B-14. Correct statement for E2 Reaction is :
(1) It is a two step process.
(2) It is an unimolecular reaction
(3*) Strong base favours
(4) Carbanion is formed during the reaction

B-15. Arrange the following in decreasing order of stability of their transition state during elimination by strong base



I II III

(1*) II > I > III (2) II > III > I (3) I > III > II (4) I > II > III

B-16. For the reaction $CH_3CH(X)CH_2CH_3 \xrightarrow[\Delta]{\text{alc. KOH}} CH_3-CH=CH-CH_3 + CH_2=CH-CH_2-CH_3$

(1*) CH_3–CH=CH–CH_3 predominates. (2) CH_2=CH–CH_2–CH_3 predominates.

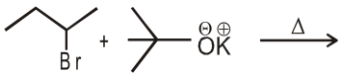
(3) Both are formed in equal amounts. (4) The product ratio depends upon the type of X.

B-17. Reactivity order of halides for dehydrohalogenation is **[AIPMT 2002]**

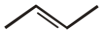
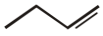
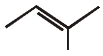
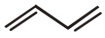
(1) R – F > R – Cl > R – Br > R – I (2*) R – I > R – Br > R – Cl > R – F

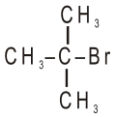
(3) R – I > R – Cl > R – Br > R – F (4) R – F > R – I > R – Br > R – Cl

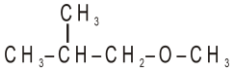
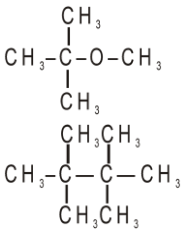
B-18.

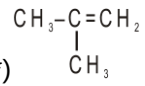


The major product of the above reaction :

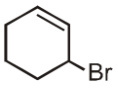
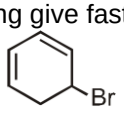
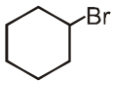
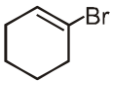
(1)  (2*)  (3)  (4) 

B-19.  + $NaOCH_3$ ⟶ Product

(1)  (2) 

(3*)  (4)

B-20. Which of the following give fastest reaction with alcoholic KOH?

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

Section (C) : Elimination reaction of alcohols

C-1. Dehydration of alcohol is an example of :

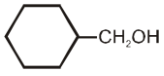
(1) addition reaction (2) substitution reaction

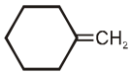
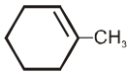
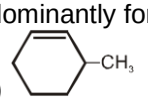
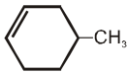
(3*) elimination reaction (4) rearrangement

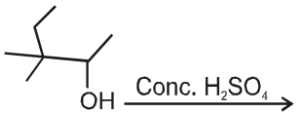
C-2. Which of the following step is involved in the acid catalysed dehydration of alcohols ?

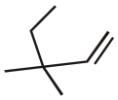
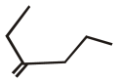
(1) Expulsion of a OH^- ion (2) A free radical intermediate formation

(3*) A carbocation intermediate formation (4) A carbanion intermediate formation

C-3.  on dehydration with conc. H_2SO_4 predominantly forms

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

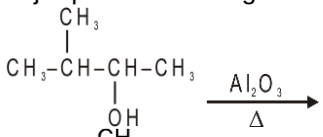
C-4.  Major product is :

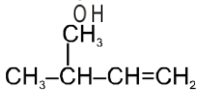
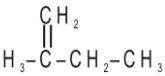
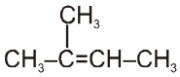
(1)  (2)  (3*)  (4) 

C-5. Which of the following can work as dehydrating agent for alcohols ?

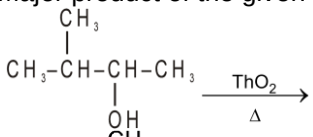
(1) H_2SO_4 (2) Al_2O_3 (3) H_3PO_4 (4*) All of these

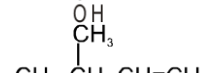
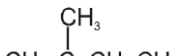
C-6. Major product of the given reaction is :



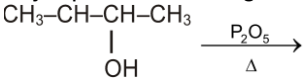
(1)  (2)  (3*)  (4) $CH_3–CH_2–CH_2–CH=CH_2$

C-7. Major product of the given reaction is :



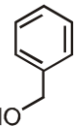
(1*)  (2)  (3)  (4) $CH_3–CH_2–CH_2–CH=CH_2$

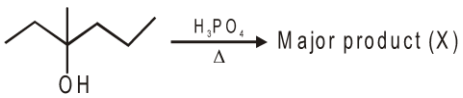
C-8. Major product of the given reaction is :



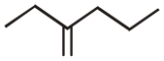
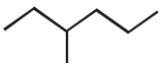
(1) $CH_3–CH_2–CH=CH_2$ (2)  (3*) $CH_3–CH=CH–CH_3$ (4) None of these

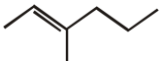
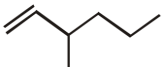
C-9. Which of them can be dehydrated by conc. H_2SO_4 at elevated temprature?

(1)  (2) $CH_3–OH$ (3)  (4*) None of these

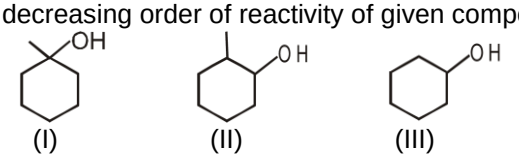
C-10. 

The major product 'X' is :

(1)  (2) 

(3*)  (4) 

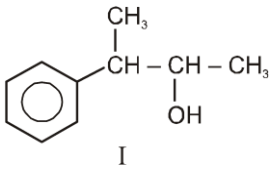
C-11. Correct decreasing order of reactivity of given compounds towards E1 reaction is

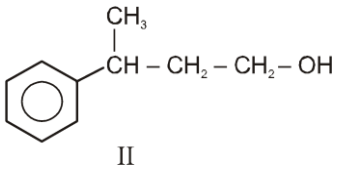


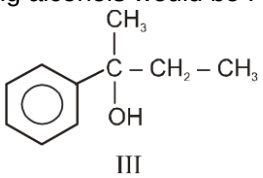
(I) (II) (III)

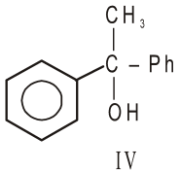
(1*) I > II > III (2) I > III > II (3) III > I > II (4) II > III > I

C-12. The relative rate of acid catalysed dehydration of following alcohols would be :

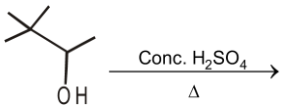

I

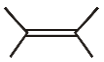
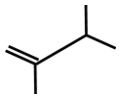

II


III

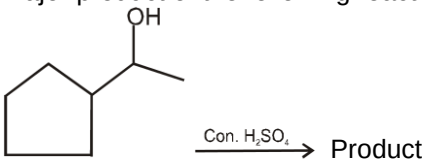

IV

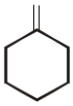
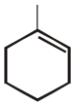
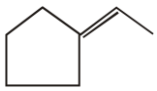
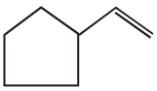
(1) III > I > IV > II (2) III >IV > I > II (3) I > III > IV > II (4*) IV > III > I > II

C-13. 
Major product

(1*)  (2)  (3)  (4) None of these

C-14. Major product of the following reaction is :



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

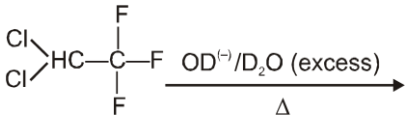
Section (D) : Miscellaneous elimination reactions

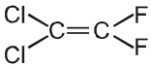
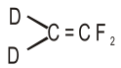
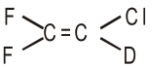
D-1. D-exchange is observed in :

(1) E1 (2) E2 (3*) E1cB (4) none of these ¼buesa ls dksbZ ughaA½

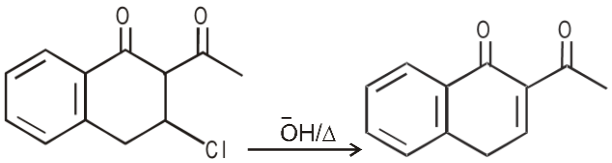
D-2. Reaction intermediate of E1cB reaction is :

(1) Carbocation (2*) Carbanion (3) Benzyne (4) Free radical

D-3. 
possible product is/ are :

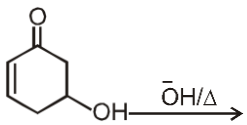
(I)  (II) $Cl_2CD–CF_3$ (III)  (IV) 

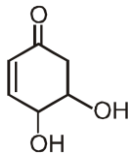
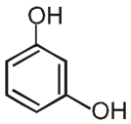
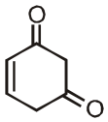
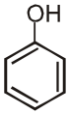
(1*) I & II (2) I & III (3) I only (4) I & IV

D-4. 

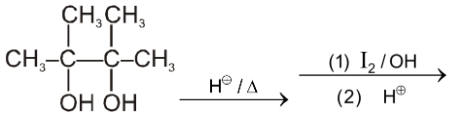
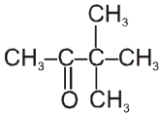
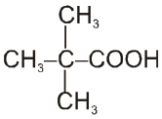
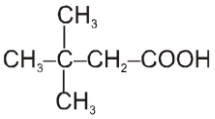
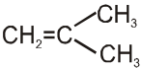
The above reaction is example of :

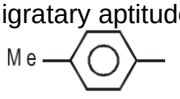
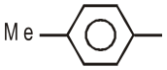
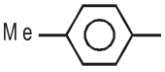
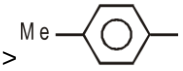
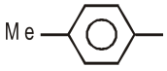
(1) E 2 (2) E 1 (3) S_N2 (4*) E1cB

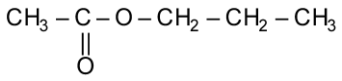
D-5. 
Product is :

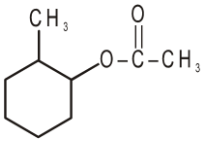
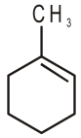
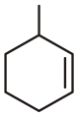
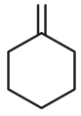
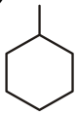
(1)  (2)  (3)  (4*) 

D-6. Pinacol –Pinacolone reaction is an example of -
(1*) Elimination (2) Substitution (3) Addition (4) isomerisation

D-7.  (X) + CHI_3
(X) is
(1)  (2*)  (3)  (4) 

D-8. The correct order of migratary aptitude in pinacole-pinacolone rearrangement is :
(1*) MeO >  > O_2N
(2) MeO <  < O_2N
(3) > MeO >  O_2N
(4) O_2N >  MeO > 

D-9.  $CH_3COOH + CH_3 – CH = CH_2$
This reaction is completed by
(1) E1 (2) E2 (3*) Ei (4) E1cB

D-10.  X + Y ; X and Y are :
(1)  + CH_3–COOH (2*)  + CH_3COOH
(3)  + CH_3COOH (4)  + CH_3COOH

Section (E) : Chloroform / CCl_4 / Freon / Ethylene glycol / Glycerol

E-1. Which of the following is a geminal dihalides ?
(1) Ethylene bromide (2*) Propylidene chloride (3) Propylene bromide (4) Isopropyl bromide

E-2. If chloroform is left open in air in presence of sun-rays :
(1*) Phosgene gas is formed (2) Explosion takes place
(3) Polymerisation take place (4) No reaction take place

E-3. The purity of $CHCl_3$ can be checked by treating with :
(1) NaOH (2) HCl (3*) $AgNO_3$ (4) C_2H_5–OH

E-4. Pure $CHCl_3$ and pure CHI_3 can be distinguished by :
(1) treating with litmus paper (2) treating with aq. KOH
(3) treating with HCl (4*) treating with $AgNO_3$

E-5. Freon used as refrigerant is :
(1) $CF_2=CF_2$ (2) CH_2F_2 (3*) CCl_2F_2 (4) CF_4

E-6. CCl_4 is a well known fire extinguisher. However after using it to extinguish fire, the room should be well ventilated. This is because.
(1) It is inflammable at higher temperature.
(2) It is toxic.
(3*) It produces phosgene by reaction with water vapours at high temperatures.
(4) It is corrosive.

E-7. Chloropicrin is :
(1) Picric acid derivative (2*) Nitrochloroform (3) Nitromethane (4) Nitroethylchloride

E-8. In the reaction $CH\equiv CH + 2Cl_2 \longrightarrow CHCl_2–CHCl_2$ the product is :
(1) called westrosol. (2*) used as a solvent.
(3) used as a fire extinguisher. (4) used as anaesthetic.

E-9. When ethyl alcohol is heated with a paste of bleaching powder, we get a compound in which the function of bleaching powder is.
(1) an oxidising agent.
(2) a chlorinating agent.
(3) a hydrolysing agent.
(4*) the chlorinating, oxidising and hydrolysing agent.

E-10. Acrolein is formed when glycerol is heated with :
(1) acidified $KMnO_4$ (2) Br_2 Water (3*) $KHSO_4$ (4) HNO_3

E-11. Which of the following compound is obtained when glycerol is heated with oxalic acid at 260°C ?
(1) Formic acid (2*) Allyl alcohol (3) Carbon dioxide (4) glycerol dioxalate

E-12. In cold countries, ethylene glycol is added in the water used in the radiators of cars during winters, this results in
(1*) Lowering in freezing point (2) Reducing the viscosity
(3) Reducing the specific heat (4) Making water a better conductor of electricity

E-13. Methanol and ethanol are miscible in water due to :
(1) Covalent character (2*) Hydrogen bonding character
(3) Oxygen bonding character (4) None of the above

E-14. The boiling points of alcohols are much higher than those of hydrocarbons of comparable molecular masses. This is due to :
(1) Dipole-dipole interactions (2*) Intermolecular hydrogen bonding
(3) Van der Waal's forces of attraction (4) Intramolecular hydrogen bonding

E-15. Which of the following is poisonous?
(1*) Methanol (2) Ethanol (3) Glycerol (4) Castor oil

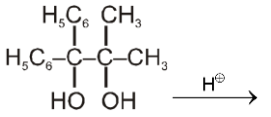
E-16. Which of the following is responsible for depletion of the ozone layer in the upper strata of the atmosphere ? **[AIPMT 2004]**
(1) Polyhalogens (2) Ferrocenes (3) Fullerenes (4*) Freons

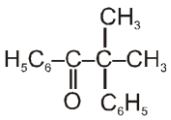
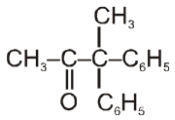
Exercise-2

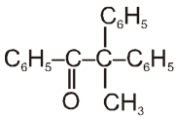
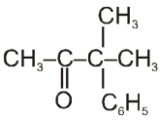
Marked Questions may have for Revision Questions.

PART - I : OBJECTIVE QUESTIONS

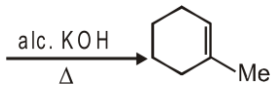
1. The major product obtained on acid–catalysed dehydration of 2–Phenylbutan -2-ol is :
(1) 2-Phenylbut-1- ene (2*) 2-Phenylbut-2- ene
(3) 3-Phenylbut-1- ene (4) None of these

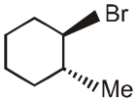
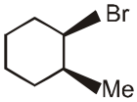
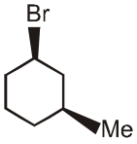
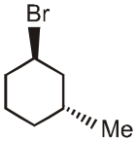
2.  Product is :

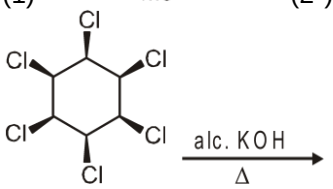
(1)  (2*) 

(3)  (4) 

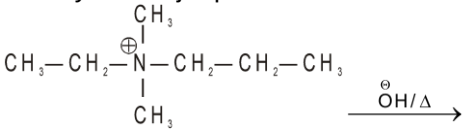
3. $PhCH_2CH_2OH \xrightarrow{TsCl} \xrightarrow{KBr} \xrightarrow{alc.KOH}$ product is (mRikn gS) :
(1) $PhCH_2CH_2Br$ (2) $PhCH_2CH_2OH$ (3*) $Ph–CH=CH_2$ (4) $PhCH(OH)CH_3$

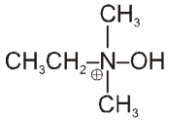
4. (X)  (major)
X is :

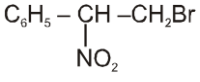
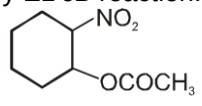
(1)  (2*)  (3)  (4) 

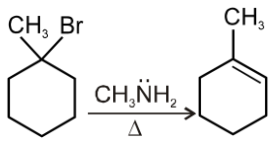
5.  major product is :
(1) 1,2,3-Trichlorobenzene (2*) 1,3,5-Trichlorobenzene
(3) Benzene (4) Hexachlorobenzene

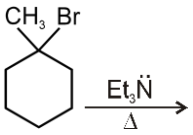
6. Identify the major product in the following reaction ?

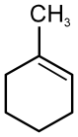
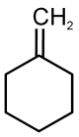
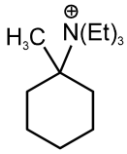


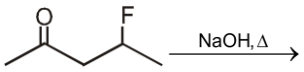
(1) $CH_3–CH=CH_2$ (2*) $CH_2= CH_2$ (3)  (4) CH_3OH

7. On reaction with base which can gives elimination by E1 cB reaction.
(1) $CF_3 – CHCl_2$ (2)  (3)  (4*) All of these

8. If  ; Then what will be the major product of the following reaction

 major product

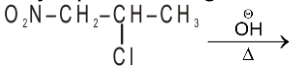
(1)  (2*)  (3)  (4) 2 & 3 both

9.  (Product)

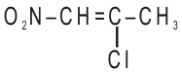
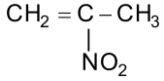
The major product of the above reaction is obtained by mechanism

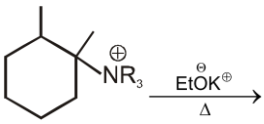
(1) S_N2 (2) E2 (3*) E1cB (4) S_N2, E2 mixed mechanism

10. Major product of given reaction is -

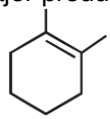
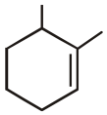
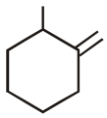
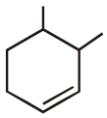
 Major product

(1*) $O_2N–CH=CH–CH_3$ (2) $O_2N–CH_2–CH=CH_2$

(3)  (4) 

11.  Major product.

Major product is :

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

12. Which of the following is not correct for E1cB reaction-

(1) It is a two step process. (2*) Intermediate is carbocation

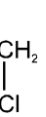
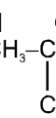
(3) D- exchage will takes place in presence $\overset{\ominus}{O}D$ of/D_2O (4) Leaving group with strong –I effect favours

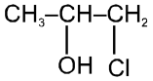
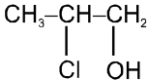
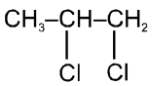
13. Phosgene is a poisonous gas obtained in chloroform bottles, substance used to make it non-poisonous is :

(1) Formic acid (2*) Ethanol (3) Dichloro methane (4) CH_3COOH

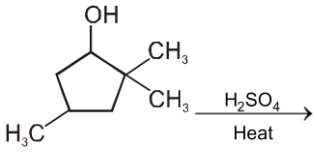
14. Identify 'Z' in the following reaction series,

$CH_3.CH_2CH_2Br \xrightarrow{\text{aq. NaOH}} (X) \xrightarrow[\text{Heat}]{Al_2O_3} (Y) \xrightarrow{HOCl} (Z)$

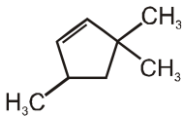
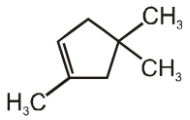
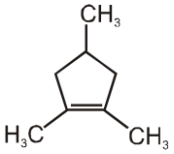
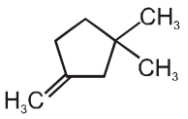
(1) Mixture of  and 

(2*)  (3)  (4) 

15. The major product formed in the following reaction is : **[NSEC-2007]**



Major product

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

16. Compound X on treatment with HI gives Y. Y on treatment with ethanolic KOH gives Z (an isomer of X). Ozonolysis of Z (with H_2O_2 workup) gives a two-carbon carboxylic acid and four carbon ketone. Hence, X is:

(1) 2-methyl-2-pentene (2) 4-methyl-1-pentene **[NSEC-2009]**

(3) 2, 3-dimethyl-2-butene (4*) 3-methyl-1-pentene

PART - II : MISCELLANEOUS QUESTIONS

Section (A) : ASSERTION/REASONING

DIRECTIONS :

Each question has 4 choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

(1) Both assertion and reason are correct, and the reason is the correct explanation for the assertion.

(2) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion.

(3) The assertion is incorrect, but the reason is correct.

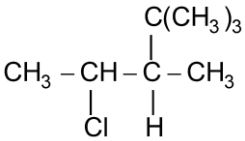
(4) Both assertion and reason are incorrect.

A-1. **Assertion :** The ease of dehydration of alcohol follows the order : Primary > Secondary > Tertiary.
Reason : –OH is good leaving group.

A-2. **Assertion :** $CH_3 - CHBrCH_3 \xrightarrow[\Delta]{\text{alc. KOH}} CH_3 - CH = CH_2 \xrightarrow{BrCl} CH_3CHCl\,CH_2Br$
Reason : In above reaction product formed is based on the principle of E2 & electrophilic addition reaction by markownikov's rule.

A-3. **Assertion :** 3° alcohols undergo dehydration more readily than 1° alcohols.
Reason : 3° alcohols are less acidic than 1° alcohols generally.

A-4. **Assertion :** In the given compound strong base ($EtO^{\ominus}$) takes away the most acidic & least crowded β-H atom to give the major product.



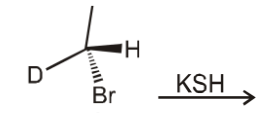
Reason : When most crowded β-H is lost, most stable transition state is formed and most branched alkene is formed as the major product.

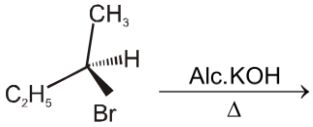
A-5. **Assertion :** The rate of bimolecular elimination reaction of $CH_3–CH_2–Br$ is faster than $CD_3–CH_2–Br$.
Reason : The β–H and the leaving group (Br^-) are eliminated simultaneously in the single step in bimolecular elimination.

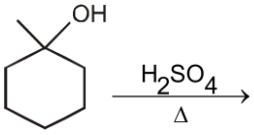
Section (B) : MATCH THE COLUMN

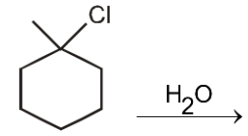
B-1. Match List I (Reaction) with List II (Type of reaction) and select the correct answer using the code given below the lists :

List I **List II**

(1)  (p) S_N1

(2)  (q) S_N2

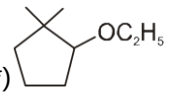
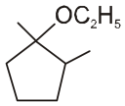
(3)  (r) E1

(4)  (s) E2

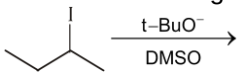
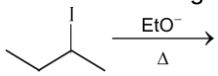
Section (C) : ONE OR MORE THAN ONE OPTIONS CORRECT

C-1. Predict the products expected in given reaction

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

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

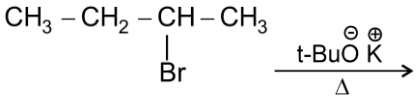
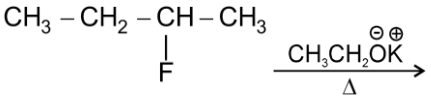
C-2. Which of the following statement (s) is/are true about the following eliminations ?

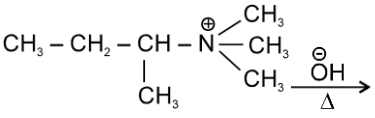
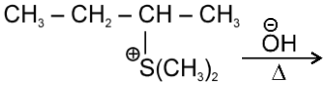
(I)  (II) 

(1*) Hofmann product is major product in I. (2) Saytzeff product is major product in I

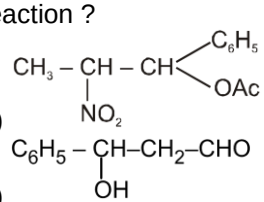
(3) Hofmann product is major product in II. (4*) Saytzeff product is major product in II

C-3. In which reaction product formation takes place by Hofmann rule ?

(1*)  (2*) 

(3*)  (4*) 

C-4. Which of the following compounds can give E1 cB reaction ?

(1*) $(CH_3)_3\overset{+}{N}-CH_2-CH_2-CN$ (2*) 

(3) $CH_3-CH_2-CH_2Br$ (4*)

C-5. Which of the following order is/are correct for the rate of E2 reaction in presence of alcoholic KOH?

(1) 5-Bromocycloheptene > 4-Bromocycloheptene

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

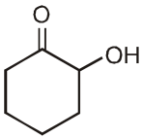
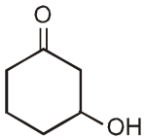
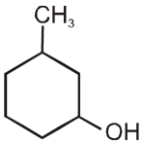
(3*) 3-Bromocyclohexene > Bromocyclohexane

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

Exercise-3

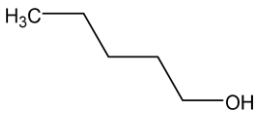
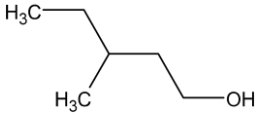
PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

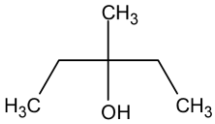
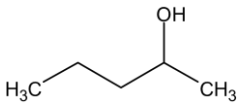
1. Maximum dehydration takes place that of : **[AIEEE-2002, 3/225]**

(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

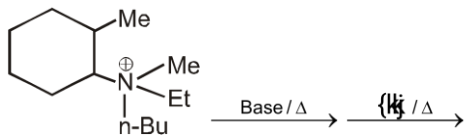
3. Among the following compound which can be dehydrated very easily is : **[AIEEE-2004, 3/225]**

(1)  (2) 

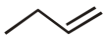
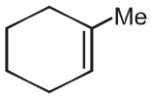
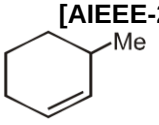
(3*)  (4) 

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

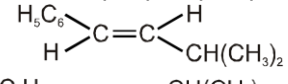
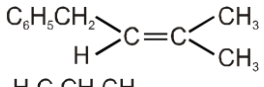
6. 

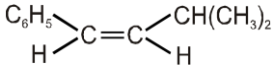
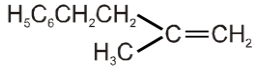
The alkene formed as a major product in the above elimination reaction is : **[AIEEE-2006, 3/165]**

(1)  (2*) $CH_2 = CH_2$ (3)  (4) 

7. The main product of the following reaction is : **[AIEEE-2010, 4/144]**

$C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{conc. } H_2SO_4}$

(1*)  (2) 

(3)  (4) 

8. Consider the following reaction:

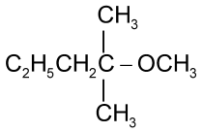
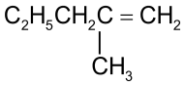
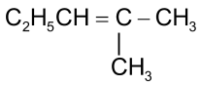
$C_2H_5OH + H_2SO_4 \rightarrow$ Product

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. The major organic compound formed by the reaction of 1,1,1-trichloroethane with silver powder is : **[JEE(Main) 2014, 4/120]**

(1) Acetylene (2) Ethene (3*) 2-Butyne (4) 2-Butene

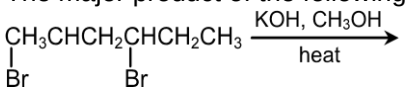
10. 2-Chloro-2-methylpentane on reaction with sodium methoxide in methanol yields : **[JEE(Main) 2016, 4/120]**

(a)  (b)  (c) 

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

JEE (MAIN) ONLINE PROBLEMS (PREVIOUS YEARS)

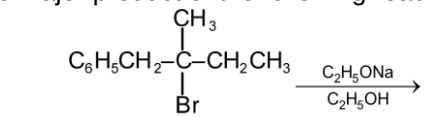
1. The major product of the following reaction is : **[JEE(Main) 2017 Online (08-04-17), 4/120]**

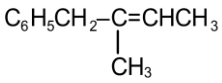
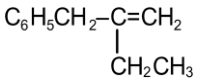


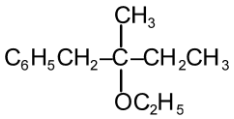
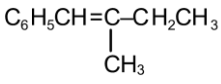
(1) $CH_3CH=C=CHCH_2CH_3$ (2*) $CH_2=CHCH=CHCH_2CH_3$

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

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



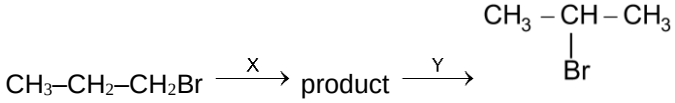
(1)  (2) 

(3)  (4*) 

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

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

1. Identify the set of reagents/reaction conditions 'X' and 'Y' in the following set of transformations.

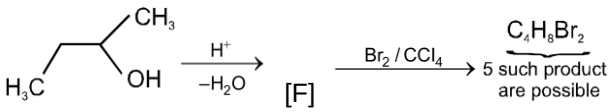
 **[IIT-JEE 2002(S), 3/150]**

(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

2. 

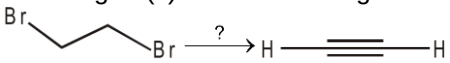
How many structures of F is possible? **[IIT-JEE 2003(S), 4/144]**

(A) 2 (B) 5 (C) 6 (D*) 3

3. 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 + $ZnCl_2$

4. The reagent(s) for the following conversion, **[JEE - 2007, 3/162]**

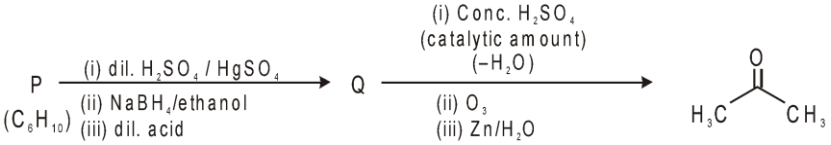


is/are

(A) alcoholic KOH
(B*) alcoholic KOH followed by $NaNH_2$
(C) aqueous KOH followed by $NaNH_2$
(D) Zn/CH_3OH

Comprehension # 1

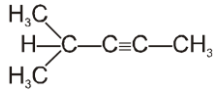
An acyclic hydrocarbon **P**, having molecular formula C_6H_{10}, gave acetone as the only organic product through the following sequence of reactions, in which Q is an intermediate organic compound.

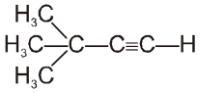


5. The structure of compound **P** is **[JEE 2011, 3/160]**

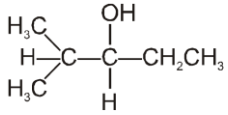
(A) $CH_3CH_2CH_2CH_2–C\equiv C–H$

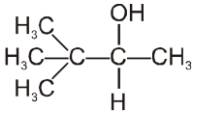
(B) $H_3CH_2C–C\equiv C–CH_2CH_3$

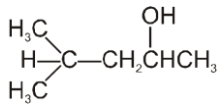
(C) 

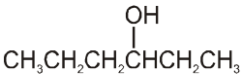
(D*) 

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

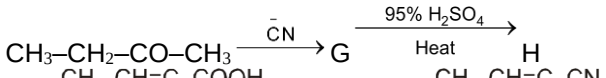
(A) 

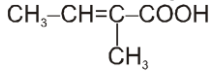
(B*) 

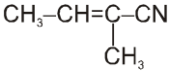
(C) 

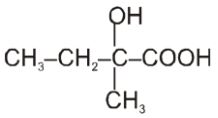
(D) 

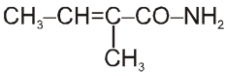
7. The major product (H) in the given reaction sequence is : **[IIT-JEE 2012, 3/136]**



(A*) 

(B) 

(C) 

(D) 

Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

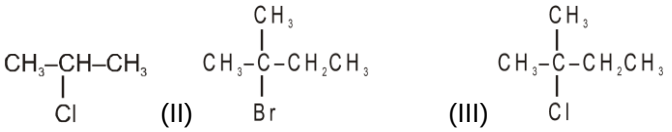
This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

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

Important Instructions

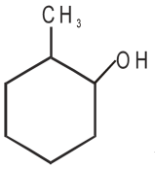
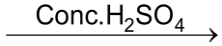
1. The test is of **1 hour** duration.
2. The Test Booklet consists of **30** questions. The maximum marks are **120.**
3. Each question is allotted **4 (four)** marks for correct response.
4. Candidates will be awarded marks as stated above in Instructions No. 3 for correct response of each question.
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. The correct increasing order of reactivity for following alkyl halides towards elimination reaction with alcoholic KOH is :



(I) (II) (III)

(1) II > I > III (2) I > II > III (3*) II > III > I (4) III > II > I

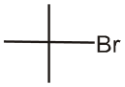
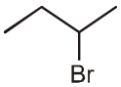
2. In the given reaction :   [X] as major product
[X] will be :

3. Select the incorrect option for the following statements.
(1) Bimolecular elimination of alkyl halides is a stereospecific reaction.
(2) In S_N2 reaction a single isomer is the only product.
(3*) Alcohol dehydrate in strongly basic conditions by E1 mechanism.
(4) 3-hydroxypropanal dehydrates in strong basic condition by E1cB mechanism.

4. Which of the following conformations of meso 2,3-dibromobutane will give bromoalkene with alcoholic KOH?
(1*) Gauche form (2) Anti form
(3) Partial eclipsed form (4) Fully eclipsed form

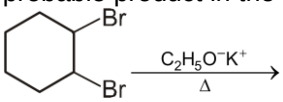
5. 2-Bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is
(1) 2-Ethoxypentane (2) pent-1-ene (3) cis-pent-2-ene (4*) trans-pent-2-ene

6. Correct order of E2/S_N2 ratio is :

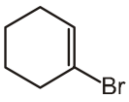
 

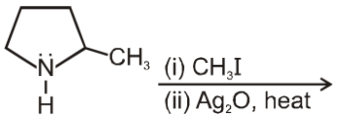
P = Q = R = CH_3–Br S = CH_3–CH_2–Br
(1*) P > Q > S > R (2) P > Q > R > S (3) R > S > Q > P (4) P > S > Q > R

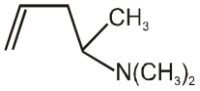
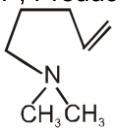
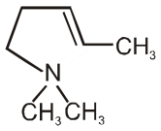
7. The most probable product in the following reaction is :



Trans

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

8.  P, Product P is :

(1)  (2*)  (3)  (4) None

9. Which statement is false for elimination reaction

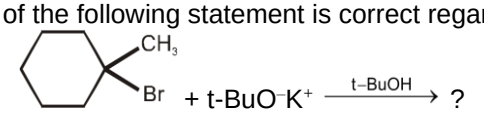
(1) β-elimination is more common than α & γ elimanation

(2) In β-elimination, those in formation of multiple bond occur.

(3) β-elimination may be E1, E2 or E1cB.

(4*) E1 & E2 requires presence of poor leaving group but E1cB requires presence of good leaving group.

10. Which of the following statement is correct regarding following reaction ?



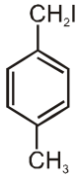
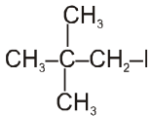
(1) Major product is endocyclic alkene formed according to Saytzeff.

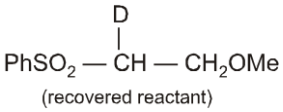
(2) Major product is exocyclic alkene formed according to Saytzeff.

(3*) Major product is exocyclic alkene formed according to Hoffmann.

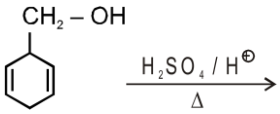
(4) Major product is endocyclic alkene formed according to Hoffmann.

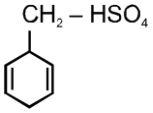
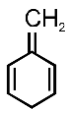
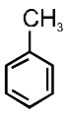
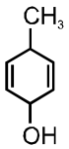
11. Substrate that show E1 reaction **[Ref. AKG Sir]**

(1) $CH_3CH_2\overset{\ominus}{I}$ (2)  (3*)  (4) 

12. $PhSO_2CH_2 — CH_2 — OMe \xrightarrow[Et\,OD]{EtO^{\ominus}}$ product + 

The product is : **[VKP Sir]**

13.  A. The product A is :

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

14. Typical features of E2 involve :

(1) Two step reaction

(2) Second step is the rate determining step

(3*) Anti-periplanar transition state

(4) Formation of a carbanion intermediate, stabilized by conjugation with a strong –M group

15. An alkyl chloride produces a single alkene on reaction with sodium ethoxide and ethanol. The alkene further undergoes hydrogenation to yield-2-methylbutane. Identify the alkyl chloride from amongst the following :

(1) $ClCH_2C(CH_3)_2CH_3$ (2) $ClCH_2CH_2CH_2CH_3$

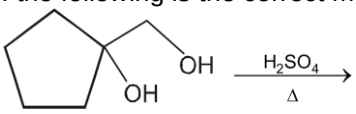
(3*) $ClCH_2CH(CH_3)CH_2CH_3$ (4) $CH_3C(Cl)(CH_3)CH_2CH_3$

16. Relative ease of dehydration of alcohol follows :

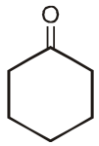
(1*) 3º > 2º > 1º alcohol (2) 1º > 2º > 3º alcohol

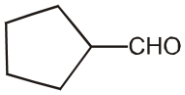
(3) 2º > 3º > 1º alcohol (4) 3º > 1º > 2º alcohol

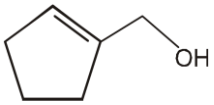
17. Which of the following is the correct major product for given reaction ?

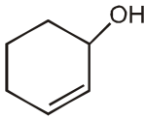


Product

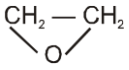
(1) 

(2*) 

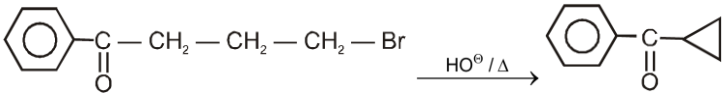
(3) 

(4) 

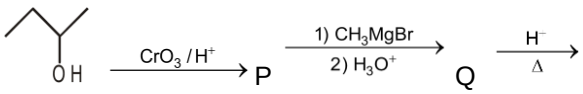
18. Which of the following is a β-elimination reaction ?

(1) $HO–CH_2–CH_2–Br \xrightarrow{NaOH/\Delta}$ 

(2) $CHCl_3 + KOH \xrightarrow{\Delta} :CCl_2$

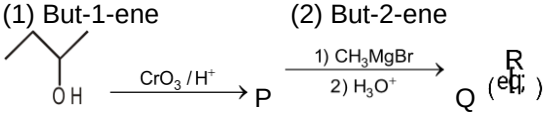
(3) 

(4*) $CH_2=CH–Cl \xrightarrow[\Delta]{NaNH_2} HC\equiv CH$

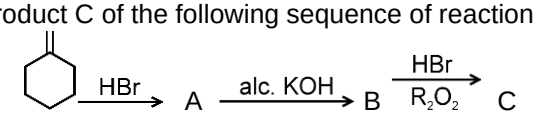
19. 

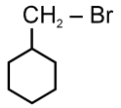
R is :

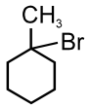
(1) But-1-ene (2) But-2-ene (3*) 2-methylbut-2-ene (4) 2-methyl propene

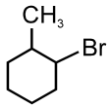


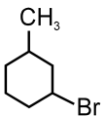
20. The product C of the following sequence of reaction



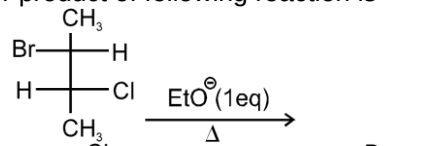
(1) 

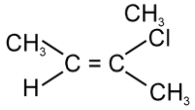
(2) 

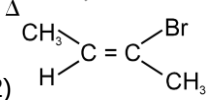
(3*) 

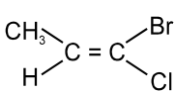
(4) 

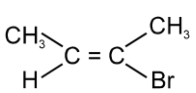
21. The major product of following reaction is



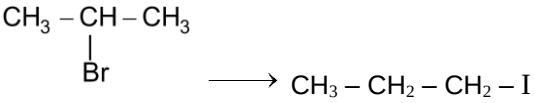
(1*) 

(2) 

(3) 

(4) 

22. What is the correct sequence of reagent/s for the following conversion **[Ref.: ASW Sir]**



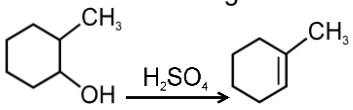
(1) alc. KOH → HI →

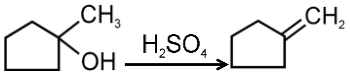
(2) aq. KOH → H_2SO_4, Δ → HI →

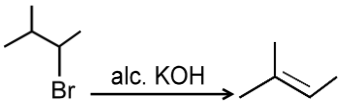
(3*) alc. KOH → HBr / R_2O_2 → KI, acetone →

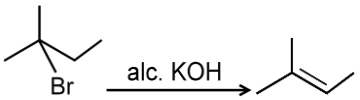
(4) alc. KOH → HCl → KI, acetone →

23. In which of the following reaction the single product formed is not the saytzeff's product

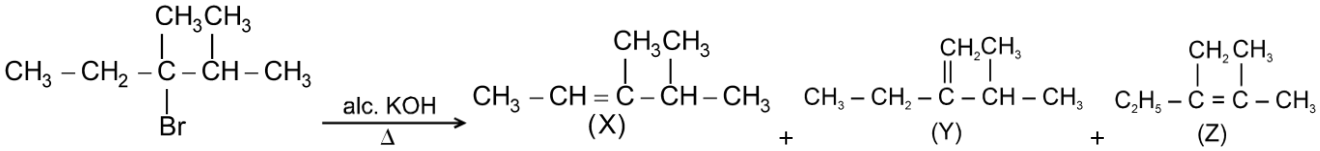
(1) 

(2*) 

(3) 

(4) 

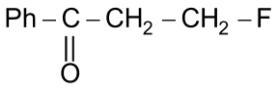
24. In the following reaction the correct order of percentage of products X, Y and Z is



(1) X > Y > Z (2) Z > Y > X (3*) Z > X > Y (4) Y > Z > X

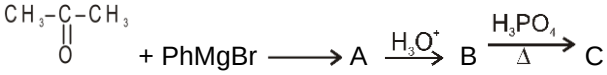
25. The rate of elimination is fastest in

(1) $Ph–CH_2–CH_2–F$

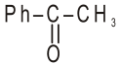
(2*) 

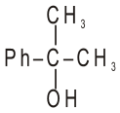
(3) $Ph–O–CH_2–CH_2–F$

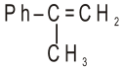
(4) $CH_3–CH_2–CH_2–F$

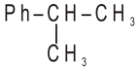
26. 

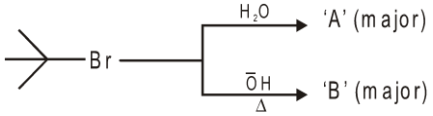
C is :

(1) 

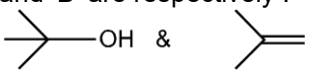
(2) 

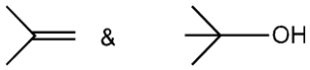
(3*) 

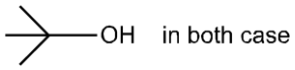
(4) 

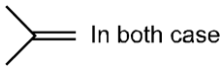
27. 

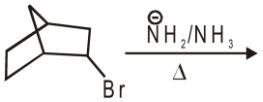
'A' and 'B' are respectively :

(1) 

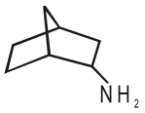
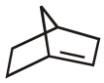
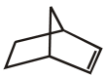
(2) 

(3*) 

(4) 

28. 

'A' is

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

29. The compound that is most reactive with alcoholic KOH is **[NSEC-2014]**
(1) CH_2=CH–Br (2) CH_3CH_2Br (3) $(CH_3)_2CH$–Br (4*) $CH_3COCH_2CH_2Br$

30. On heating glycerol with conc. H_2SO_4, a compound obtained which has an unpleasant odour. This compound is : **[NSEC-2001, 2004]**
(1) ethylene glycol (2) allyl alcohol (4*) acrolein (4) glycerol sulphate

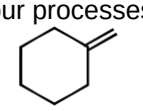
Practice Test-1 (IIT-JEE (Main Pattern))

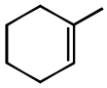
OBJECTIVE RESPONSE SHEET (ORS)

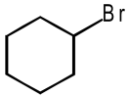
Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

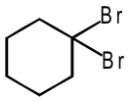
PART - II : PRACTICE QUESTIONS

1. Four processes are indicated below: **[NSEC-2015]**

(I)  $\xrightarrow{\text{(i)HBr / no peroxide (ii) alcoholic KOH, } \Delta}$

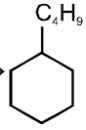
(II)  $\xrightarrow{\text{(i) HI (ii) aqueous NaOH, } \Delta}$

(III)  $\xrightarrow{\text{(i) Mg, ether (ii) } CH_2O \text{ (iii) } H^+, H_2O}$

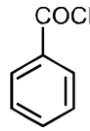
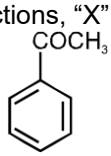
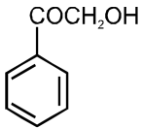
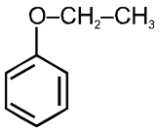
(IV)  $\xrightarrow{\text{(i) aq. KOH (ii) } CH_3MgBr\text{, ether (iii) } H_3O^+}$

The processes that do not produce 1-methylcyclohexanol are
(1) II, IV (2) I, II (3) III, IV (4*) I, III

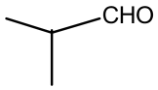
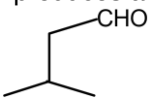
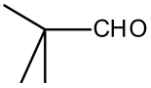
2. n-Butylcyclohexane is formed through the following sequence of reactions.

X $\xrightarrow{PCl_5,\ 0°C}$ Y $\xrightarrow[\text{ii) } H^+]{\text{i) } NaNH_2(\text{excess})}$ Z $\xrightarrow[\text{ii) } C_2H_5I \text{ iii) } H_2/Pt,\ \Delta,\ \text{pressure}]{\text{i) } NaNH_2}$ 

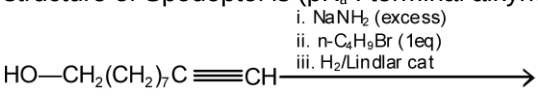
In the above scheme of reactions, "X" is – **[NCSE-2015]**

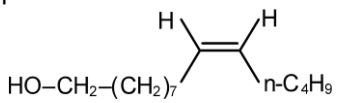
(1)  (2*)  (3)  (4) 

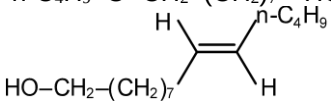
3. An alkyl halide (X) on reaction with ethanolic sodium hydroxide forms an alkene (Y) which on further reaction with HBr gives the same alkyl halide. The alkene (Y) on reaction with HBr/peroxide followed by reaction with Mg metal followed by reaction with HCN produces an aldehyde (Z). Z is : **[NCSE-2016]**

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

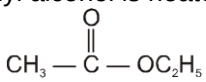
4. Spodoptol, a sex attractant, produced by a female fall armyworm moth, can be prepared as follows. The structure of Spodoptol is (pK_a : terminal alkynes ~ 25, alcohols ~ 17) **[NCSE-2016]**



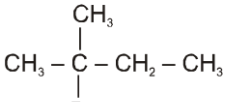
(1) $n\text{-}C_4H_9\text{–}O\text{–}CH_2\text{–}(CH_2)_7\text{—}HC{=}CH_2$ (2*) 

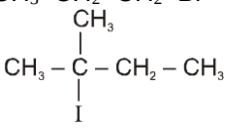
(3)  (4) $HO\text{–}CH_2\text{–}(CH_2)_{12}\text{–}CH_3$

5. Ethyl alcohol is heated with conc. H_2SO_4. The product formed is :

(1)  (2) C_2H_6 (3*) C_2H_4 (4) C_2H_2

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

(1)  (2) $CH_3\text{–}CH_2\text{–}CH_2\text{–}Br$

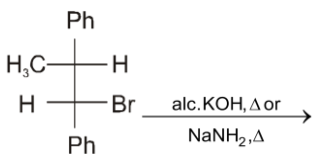
(3) $CH_3 - CH_2 - CH_2 - I$ (4*) 

7. Correct statement for E1 Reaction is :
(1) It is a two step process. (2) Rearrangement is possible.
(3) Good leaving group favours (4*) All of these

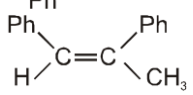
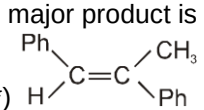
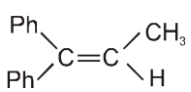
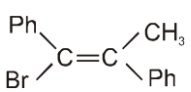
8. Which among the following compounds can give elimination reaction ?

(1) $CH_3\text{–}CH_2\text{–}Br$ (2) CH_2Br_2 (3) $CH_3\text{–}CH_2\text{–}CH_2\text{–}\overset{\oplus}{N}(CH_3)_3$ (4*) All of these mijksDr lHkh

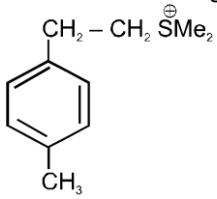
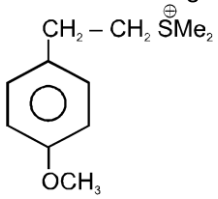
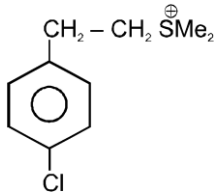
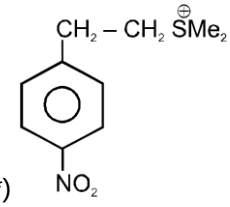
9. Dichlorocarbene is generated by the action of potassium t-butoxide on chloroform. This is an example of
(1*) α-Elimination reaction (2) β-Elimination reaction
(3) Addition reaction (4) Rearrangement reaction

10. 

major product is :

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

11. Which of the following substrates will undergo fastest reaction through E1cB route ?

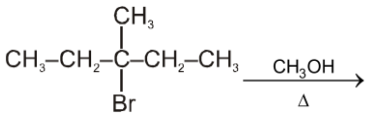
(1)  (2)  (3)  (4*) 

12. Chloropicrin is obtained by the reaction of :

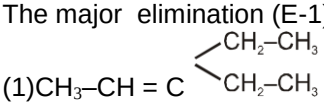
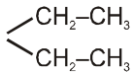
(1) Steam on carbon tetrachloride (2) Nitric acid on chlorobenzene
(3) Chlorine on picric acid (4*) Nitric acid on chloroform

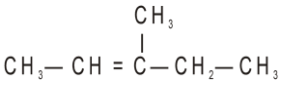
13. What happens if CCl_4 is treated with $AgNO_3$ -

(1) A white ppt. of AgCl will form (2) NO_2 will be evolved
(3) CCl_4 will dissolve in $AgNO_3$ (4*) Nothing will happen

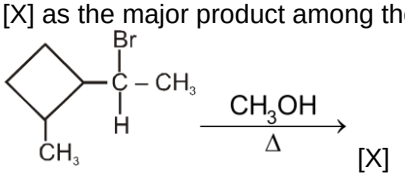
14.  P (Major elimination product)

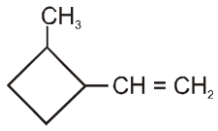
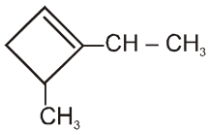
The major elimination (E-1) product P is :

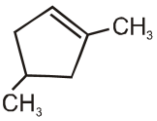
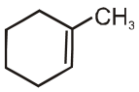
(1)  (2) 

(3) $CH_2 = CH_2$ (4*) 

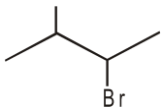
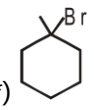
15. [X] as the major product among the elimination products is :



(1)  (2) 

(3*)  (4) 

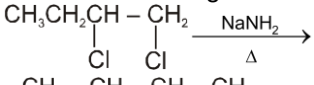
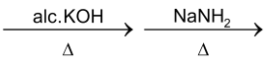
16. Halogen derivative having maximum rate of E1 reaction :

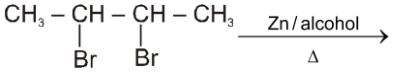
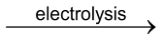
(1)  (2)  (3)  (4*) 

17. ..... is obtained when iodoform is heated with Ag powder :

(1) CH_4 (2) C_2H_4 (3) C_2H_6 (4*) C_2H_2

18. Which of the following reaction do not give alkyne ?

(1)  (2) $CH_3CH_2CHBr_2$ 

(3*)  (4) Potassium maleate 

19. Consider the following reaction, **[AIPMT 2005]**

$$\text{Ethanol} \xrightarrow{PBr_3} X \xrightarrow{\text{alc. KOH}} Y \xrightarrow[(ii)H_2O,\ \text{heat}]{(i)H_2SO_4,\ \text{room temperature}} Z\ ;$$

the product Z, is

(1) $CH_2=CH_2$ (2) $CH_3CH_2OCH_2CH_3$ (3) $CH_3CH_2OSO_3H$ (4*) CH_3CH_2OH

20. $CH_3CH_2CH_2OH \xrightarrow{PCl_5} A \xrightarrow{\text{alc KOH}} B$ **[AFMC 2003]**

B is identified as :

(1) propanal (2) propane (3) propyne (4*) propene

21. Which of the following is added to chloroform to slow down its aerial oxidation in presence of light? **[AFMC 2008]**

(1) Carbonyl chloride (2*) Ethyl alcohol (3) Sodium hydroxide (4) Nitric acid fuEu

22. Major product of the reaction **[RPMT 2011]**

$$(CH_3)_3C–Cl + C_2H_5ONa \rightarrow$$

would be :

(1) $(CH_3)_2C–OC_2H_5$ (2) $(CH_3)_3C–C_2H_5$ (3*) $(CH_3)_2C=CH_2$ (4) $CH_3–CH=CH–C_2H_5$

23. Common name of phosgene is :

(1) Carbon tetrachloride (2) Phosphoryl chloride (3*) Carbonyl chloride (4) Phosphorus trichloride

24. Which of the following has maximum boiling point?

(1) $CH_3CH_2CH_2Cl$ (2) $CH_3CH_2CH_2OH$

(3) CH_3CHCH_3 with OH below (4*) CH_2—CH_2—CH_2—CH_2 with OH and OH

25. Which of the following has strongest hydrogen bonding ?

(1) Ethylamine (2) Ammonia (3*) Ethyl alcohol (4) Diethyl ether