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Build Up Your Understanding

EXERCISE-I (Conceptual Questions)

ELEC	TROPHILIC ADDITION REACT	ION						
1.	Correct reactivity order for EAR of following compounds is CH ₃							
	$Ph-CH=CH_2$ $Ph-C=CH-$	-CH ₃						
	I							
	$Ph_2C = CH - CH_3 \qquad CH_2 = CH - H_3$	NO ₂						
	$III \qquad IV $	(2) III > II > I > IV						
	(3) II > III > I > IV	(4) II > III > IV > I						
2.	The intermediate during the addition	of HCl to propene in the pre	esence of peroxide is					
	(1) CH_3CHCH_2Cl	(2) $CH_3 \overset{\oplus}{CH} - CH_3$						
	$(3) CH_3 - CH_2 - CH_2 = CH_2$	(4) CH_3CHCH_2						
3.	Hydroboration of isobutylene follow (1) 1-butanol (2) 2-butanol	ved by oxid <mark>ative alk</mark> aline hyd (3) Isobutyl alcohol	rolysis gives (4) (CH ₃) ₃ C–OH					
4.	\bigcirc -CH=CH-COOH + Br ₂ \rightarrow	A						
	The number of chiral carbons in 'A'	are						
	(1) 1 (2) 2	(3) 3	(4) 4					
5.	$CH_3-CH=CH_2 \xrightarrow{dil/H_2SO_4} A$							
	$CH_3-CH=CH_2 \xrightarrow{B_2H_6} \xrightarrow{H_2O_2} H$	3						
	Wrong statement about the product : (1) A and B have the same functional	is al group						
	(2) A and B are position isomers.							
	(3) A and B show chain isomerism(4) Mixed ether is the isomer of both	A and B						
6.	(1) ethane (2) propene	(3) 1-butene	(4) 2-methyl propene					
7.	The major product of the following	reaction is						
	\bigcirc - CH=CH-CH ₃ $\xrightarrow{(i) \text{Hg(OAc)}_2, \text{H}_2\text{O}}$ $\xrightarrow{(i) \text{Hg(OAc)}_2, \text{H}_2\text{O}}$	\rightarrow						
		(2) (\bigcirc) $-CH_2-CH_2$	I-CH ₃					
	(1) $(1) - CH_2 - CH_2 - CH_2 - OH$	(=) U I I	H · · ·					
	OH							
	(3) \bigcirc $-CH-CH_2-CH_3$	(4) HO-()-CH	$H = CH - CH_3$					

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(1) HCHO (2) CH_3CHO (3) CH_3COCH_3 (4) All the above

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17.	In this reaction :								
	$CH_{3}CHO + HCN \longrightarrow CH_{3}CH(OH)CN \xrightarrow{H_{2}O} CH_{3}CH(OH)COOH$								
	an asymmetric centre is generated. The acid obtained would be :-								
	(1) D-isomer	(2) L -isomer							
	(3) 50% D +50% L-isomer	(4) 20% D + 80% L-isomer							
18	When two mole of alcohol reacts with 1 mole of ketone, it gives :-								
10.	(1) Hemiacetal (2) Acetal	(3) Hemiketal (4) Ketal							
		(3) Helliketai (4) Ketai							
19.	When acetone reacts with Grignard reagent	followed by hydrolysis, it gives :							
	(1) 1° -alcohol (2) 2° -alcohol	(3) 3° -alcohol (4) Methyl alcohol							
FREE	RADICAL ADDITION REACTIOIN								
20.	Reaction of HBr with propene in the present	nce of peroxide gives							
	(1) 3-bromo propane	(2) Allyl bromide							
	(3) n-propyl bromide	(4) Isopropyl bromide							
21.	Isobutene $\xrightarrow{\text{HBr}}_{\text{H}_2\text{O}_2}$ "product". The product	is							
	(1) Isobutyl bromide	(2) Tert. butyl bromide							
	(3) Tert. butyl alcohol	(4) isobutyl alcohol							
FREE	RADICAL SUBSTITUTION REACTION								
22.	Alkane reacts with which of the following l	halogens in dark							
	(1) F_2 (2) Cl_2	(3) I_2 (4) Br_2							
22									
23.	The nitrating agent for the nitration of alkar	les is:							
	(1) Conc. HNO_3	(2) Mixture of conc. HNO_3 and conc. H_2SO_4							
	(3) Acetyl mirate	(4) HNO_3 vapours at high temperature							
24	The chain propagating step is fastest in the	reaction of an alkane with							
2-11	(1) Fluorine free radical	(2) Chlorine free radical							
	(3) Iodine free radical	(4) Bromine free radical							
25.	In the nitration of propane, the product obta	ined in maximum yield is							
	(1) 1-nitropropane (2) 2-nitropropane	(3) Nitroethane (4) Nitromethane							
26.	Only two isomeric monochloro derivatives	are possible for (exclude stereo isomers)							
	(1) n-butane	(2) 2, 4-dimethyl pentane							
	(3) benzene	(4) 2-methyl butane							
27.	What is the chief product obtained when	n-butane is treated with bromine in the presence of							
	light at 130°C?								
	$(1) CH_3-CH_2-CH_2-CH_2-Br$	(2) $CH_3 - CH_2 - CH - Br$							
		CH_3							

(3) CH_3 -CH-CH ₂ -Br	(4) $CH_3 - CH_2 - Br$
CH_3	CH_3

ELECTROPHILIC SUBSTITUTION REACTION

- **28.** The strongest deactivating effect on aromatic ring is (1) $-CH_2Cl$ (2) $-OCH_3$ (3) $-CH_3$ (4) $-CCl_3$
- **29.** Which of the following is maximum reactive towards E.S.R. :-

\sim	\sim	
(1)	(2)	(3)

- 31. Toluene is more reactive than benzene towards electrophilic reagents due to :-
 - (1) Inductive effect only
 - (2) Hyperconjugative effect only
 - (3) Both inductive as well as hyperconjugative effects
 - (4) Strong mesomeric effect
- **32.** Nitration of benzene is (1) nucleophilic substitution

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- (1) nucleophilic substitution (3) electrophilic substitution
- (2) nucleophilic addition(4) electrophillic addition
- **33.** Consider the following compounds :



Correct order of their reactivity in electrophilic substitution reactions would be :-(1) I > II > III > IV (2) IV > III > II > I(3) III > II > I > IV (4) III > IV > I > II

34. The active species in the nitration of benzene is (1) NO_2^+ (2) HNO_3 (3) NO_3^- (4) NO_2^-

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

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	$(1) \bigcirc ^{NO_2} (2) \bigcirc ^{Cl}$	(3) CCl ₃ (4) O
NUC	LEOPHILIC SUBSTITUTION REACTION	DN
37.	The correct reactivity order of alcohols tow	vards H–X will be
		н
	$(III) CH_3 - CH_2 - OH \qquad (IV) CH_3 - CH - CH$	3
	OH	
	(1) II > I > III > IV	(2) IV > III > II > I
	(3) II > IV > I > III	(4) II > IV > III > I
38.	Which of the following product will be of HCl in presence of ZnCl ₂ . (1) t- butyl chloride	otained when neopentyl alcoholis treated with conc. (2) isobutylene
	(3) t- pentyl chloride	(4) Neo pentyl chloride
39.	In S_N 1 the first step involves the formation (1) free radical (2) carbanion	of (3) carbocation (4) final product
40.	To form alkane isonitrile, alkyl halide is read(1) KCN(2) AgCN	acted with: (3) NaCN (4) NH ₄ CN
41.	The most reactive towards S _N 1 is	
	(1) PhCH ₂ Cl	(2) PhCl
	(3) PhCHCl(CH ₃)	$(4) p-NO_2C_6H_4CH_2Cl$
12	Alkyl fluorides are synthesized by	
72.	(1) Finkelstein reaction	(2) Swart reaction
	(3) Kolbe reaction	(4) Wurtz reaction
43.	The products of reaction of alcoholic silver	nitrite with ethyl bromide are
	(1) Ethane (2) Ethyl clochol	(2) Ethene (4) Nitro ethene
	(3) Ethyl alcohol	(4) Nuro etnane
44.	For the reaction,	
	$C_2H_5OH + HX \xrightarrow{ZnX_2} C_2H_5X$, the order	of reactivity is
	(1) $HI > HCl > HBr$	(2) $HI > HBr > HCl$
	(3) HCI > HBr > HI	(4) HBr > HI > HCl
45		
45.	(1) $S_N 1$ (2) $S_N 2$	+ Br obeys the mechanism (3) E^1 (4) E^2
46.	Butanenitrile may be prepared by heating	
ч 0 .	(1) Propyl alcohol with KCN	(2) Butyl alcohol with KCN
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	(3) Butyl chloride with KCN (4) Propyl chloride with KCN
47.	The given reaction is an example of $C_2H_5Br + KCN(aq.) \longrightarrow C_2H_5CN + KBr$ (1) Elimination(2) Nucleophilic substitution(3) Electrophilic substitution(4) Redox change
48.	Most readily hydrolised halide is $(1) C_6H_5Cl$ $(2) (C_6H_5)_2CHCl$ $(3) C_6H_5CH_2Cl$ $(4) (C_6H_5)_3CCl$
49.	An alkyl halide maybe converted in to an alcohol by(1) Addition(2) Substitution(3) Dehydrohalogenation(4) Elimination
50.	Compound is most reactive towards NaOH in (1) CH_3Cl (2) $CH_2=CHCl$ (3) C_6H_5Cl (4) $C_6H_5CH_2Cl$
51.	Most stable carbocation formed from $(CH)_3C$ –Br, $(C_6H_3)_3CBr$, $(C_6H_5)_2CHBr$ and $C_6H_5CH_2B$ would be
	(1) $C_6H_5\overset{\oplus}{C}H_2$ (2) $(CH_3)_3\overset{\oplus}{C}$ (3) $(C_6H_5)_3\overset{\oplus}{C}$ (4) $(C_6H_5)_2\overset{\oplus}{C}H$
52.	S _N 1 reaction on optically active substrates mainly gives(1) Retention in configuration(2) Inversion in configuration(3) Racemise product(4) No product
53.	The hydrolysis of alkyl halides by aqueous NaOH is best termed as(1) electrophilic substitution reaction(2) electrophilic addition reaction(3) nucleophilic addition reaction(4) nucleophilic substitution reaction
54.	Reaction of sodium ethoxide and ethyl iodide will give:-(1) Ether(2) Ethyl alcohol(3) Acetaldehyde(4) Acetic acid
55.	The least reactive chlorine is present in (1) Methyl chloride (3) Ethyl chloride(2) Allyl chloride (4) Vinyl chloride
56.	Arrange the following compounds in the increasing order of their $S_N 2$ reactivity? $\begin{array}{c} CH_3 \\ CH_3 - C-X \\ CH_3 - CH_3 \\ (a) \\ (b) \\ (c) \\ (d) \end{array}$ $\begin{array}{c} (b) \\ (c) \\ (d) \\ (1) \\ (a) \\ (b) \\ (c) \\ (d) \end{array}$ $\begin{array}{c} (c) \\ (d) \\ (2) \\ (a) \\ (c) \\ (d) \\ (d) \\ (c) \\ (d) \end{array}$ $\begin{array}{c} (c) \\ (d) \\ (d) \\ (c) \\ (d) \\ (d) \\ (c) \\ (d) \end{array}$
57.	Which alcohol produces turbidity with Lucas reagent most slowly

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(1) 2-Butanol
(3) Isobutyl alcohol

(2) t-Butyl alcohol(4) Diphenylcarbinol

- **58.** The preparation of ethers from alcohols by using sulphuric acid is called :-
 - (1) Williamson's ether Synthesis
 - (2) Williamson's continuous etherification process
 - (3) Ziesel's method
 - (4) Zerewitinoff method
- **59.** The reaction of ethyl iodide with sodium ethoxide is
 - (1) An electrophilic substitution reaction
 - (2) A nucleophilic addition reaction
 - (3) A nucleophilic substitution reaction
 - (4) A free radical. substitution reaction
- **60.** The Williamson synthesis involves :
 - (1) A nucleophilic addition
 - (2) An electrophilic substitution
 - (3) SN^2 displacement
 - (4) SN^1 displacement
- 61. In the Williamson synthesis of ethers given general equation -

 $R-X + R'ONa \longrightarrow R-O-R'$ the yield from R-X follows the sequence :-

- (1) $CH_3X > 1^\circ > 2^\circ > 3^\circ$
- (2) $CH_3X < 1^\circ < 2^\circ < 3^\circ$
- (3) $CH_3X < 1^{\circ} < 2^{\circ} > 3^{\circ}$
- (4) $CH_3X > 1^{\circ} < 2^{\circ} < 3^{\circ}$
- **62.** With cone. HBr ethyl phenyl ether yields : (1) Phenol and ethyl bromide.
 - (3) Phenol and ethane

- (2) Bromobenzene and ethanol
- (4) Bromobenzene and ethane
- **63.** An unknown alcohol is treated with the "Lucas reagent' to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and by what mechanism :-
 - (1) secondary alcohol by SN1
 - (2) tertiary alcohol by SN1
 - (3) secondary alcohol by SN2
 - (4) tertiary alcohol by SN2

ELIMINATION REACTION

- **64.** The reactivity of alkyl halides in E^2 elimination reactions follows the order
 - (1) R-I < R-Br < R-CI < R-F(2) R-F < R-CI < R-Br < R-I
 - (3) R-I > R-CI > R-Br < R-F
 - (4) R-I < R-Br < R-F < R-CI
- **65.** The unimolecular elimination involves formation of

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(1) A free radical (2) A carbanion (3) A carbocation (4) A biradical

- 66. Which of the following alkyl bromides will eliminate HBr fastest

 Ethyl bromide
 Propyl bromide
 Isopropyl bromide
 t-Butyl bromide

 67. 1-phenyl-2-chloropropane on treating with alc. KOH gives mainly:

 1-phenylpropene
 2-phenylpropene
 1-phenylpropan-2-ol
- 68. Which of the following alkyl halides gives a mixture of alkenes on dehydrohalogenation
 (1) n-Propyl halide
 (2) Isopropyl halide
 (3) s-Butyl bromide
 (4) t-Butyl bromide
- 69. Arrange the following alkanols A, B and C in order of their reactivity towards acid catalysed dehydration:-

(A) $CH_{3}-CH-CH_{2}-CH_{2}-OH$ CH_{3} CH_{3}

70. The major product in the following reaction is $CH_2 - OH \xrightarrow{H^+}{\Lambda}$?

(1) \bigcirc = CH₂ (2) \bigcirc CH₃ (3) \bigcirc -CH₃ (4) \bigcirc -CH₃

- **71.** The major product obtained from the heating of 3,3-dimethyl-1- butanol with H_2SO_4 is(1) 3, 3-dimethyl-1-butene(2) 2, 3-dimethyl-2-butene(3) 2, 3-dimethyl-1-butene(4) cis and trans isomers of product (2)
- **72.** Arrange the following alkyl halides in decreasing order of the rate of elimination reaction with alcoholic KOH.

(A)
$$CH_{3}$$
-C- CH_{2} -Br (B) CH_{3} - CH_{2} -Br
(C) CH_{3} - CH_{2} - CH_{2} -Br
(1) $A > B > C$ (2) $C > B > A$ (3) $B > C > A$ (4) $A > C > B$

ANSWER KEY

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EXERCISE-I (Conceptual Questions)													
1.	(2)	2.	(2)	3.	(3)	4.	(2)	5.	(3)	6.	(4)	7.	(3)
8.	(1)	9.	(2)	10.	(4)	11.	(1)	12.	(4)	13.	(3)	14.	(2)
15.	(1)	16.	(2)	17.	(3)	18.	(4)	19.	(3)	20.	(3)	21.	(1)
22.	(1)	23.	(4)	24.	(1)	25.	(2)	26.	(1)	27.	(2)	28.	(4)
29.	(2)	30.	(1)	31.	(3)	32.	(3)	33.	(3)	34.	(1)	35.	(3)
36.	(2)	37.	(4)	38.	(3)	39.	(3)	40.	(2)	41.	(3)	42.	(2)
43.	(4)	44.	(2)	45.	(2)	46.	(4)	47.	(2)	48.	(4)	49.	(2)
50.	(4)	51.	(3)	52.	(3)	53.	(4)	54.	(1)	55.	(4)	56.	(1)
57.	(3)	58.	(2)	59.	(3)	60.	(3)	61.	(1)	62.	(1)	63.	(2)
64.	(2)	65.	(3)	66.	(4)	67.	(1)	68.	(3)	69.	(3)	70.	(3)
71.	(2)	72.	(4)										