MDCAT MCQS WITH EXPLANATION.

CHAPTER HYDROCARBONS.

PART-2 CHEMISTRY.

“MCQ’s”

Q36. A hydrocarbon which is a liquid at room temperature decolorizes aqueous brumine, Could be molecular formula of the compound.

a. $C_{10}H_{20}$

b. C_2H_2

c. C_2H_4

d. C_7H_{16}

PATHO TO PERIO
PP
MAKE TODAY COUNT.

Q37. A compound "V" is added to a solution of brumine in tertachloro methane and the color of bromine is immediately discharged. Which one of the following could be compound "V”

a. Benzene

b. Pentane

c. Cyclohexane

d. Pentene

Q38. The reaction of ethyl chloride with alcohlic KOH at 170°C to form ethene is:

a. Addition reaction

b. Substitution reaction

c. Elimination reaction

d. Oxidation-reduction reaction

Q39. The presence of double bond in ethene makes it:

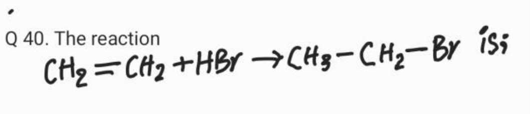
a. Electrophilic in nature

b. Nucleophilic in nature

c. Acidic in nature

d. Both a and b

Q40.



Q 40. The reaction

$CH_2 = CH_2 + HBr \rightarrow CH_3 - CH_2 - Br$ is:

a. Electrophilic addition

b. Nucleophilic addition

c. Electrophilic subtraction

d. Nucleophilic subtraction

Q41. Ethylene is used for:

a. Welding purposes

b. Making poisonous mustard gas

c. Making plastic bags

d. All of these

Q42. Stability of the alkynes depends on:

a. Position of triple bond

b. Number of substituents

c. Nature of substituents

d. All of these

Q43. Ethene and ethyne can be distinguished by:

a. Anhydrous $AlCl_3$

PATHO TO PERIO
PP
MAKE TODAY COUNT.

b. $Br_2\ in\ C_{Cl4}$

c. Cold H_2SO_4

d. $AgNO_3\ in\ NH_4$OH

Q44. Choose the correct name according to IUPACC nomenclature:

a. 2-Ethyl-3-methyl pentane

b. 3-methyl cyclohexane

c. 3-Ethyle-2-methyl pentane

d. 3-Ethyle-4-methyl pentane

Q45. Which one of the following statements about the Carbon-Carbon bond in benzene is not true?

a. It is shorter than a C---C bond in alkane

b. It is shorter than a C =C bond in alkene

c. It is equal to C-C bond in alkane

d. All the carbon-carbon bonds are different in length

Q46. Which of the following compounds may exist as cis-trans isomers?

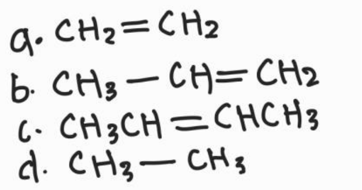
a. 1-butene

b. 2-butene

e. Cyclopropane

d. Acetone

Q47.Which of the following compounds show geometrical isomerism?



a. $CH_2=CH_2$

b. $CH_3-CH=CH_2$

c. $CH_3CH=CHCH_3$

d. CH_3-CH_3

PATHO TO PERIO
PP
MAKE TODAY COUNT.

Q48. Plane - polarized light is affected by:

a. Identical molecules

b. All polymers

c. Chiral molecules

d. All biomolecules

Q49. Optical isomerism is shown by:

a. n-butyl chloride

b. Sec-butyl chloride

c. Tert-butyl chloride

d. Isobutyl chloride

Q50. Propanone and propenol are:

a. Tautomers

b. Metamers

c. Enantiomers

d. Cis-trans isomers

Q51 Benzene cannot undergo:

a. Elimination

b. Substitution

c. Oxidation

d. Addition

Q52.In sulphonation of benzene the electrophile is:

a. SO_3

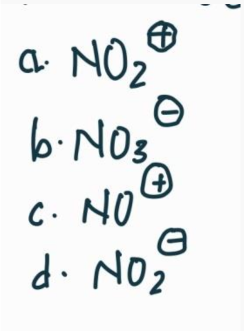
b. HSO_4^-

PATHO TO PERIO
PP
MAKE TODAY COUNT.

c. H_2SO_4

d. NH_4^+

Q 53. When Benzene is nitrated, concentrated nitric acid and H_2SO_4react to form an intermediate which attacks the Benzenering. Which one of the following represents this intermediate?



a. $NO_2^{\oplus}$

b. $NO_3^{\ominus}$

c. $NO^{\oplus}$

d. $NO_2^{\ominus}$

Q54. Catalyst used for Friedel craft reaction:

a. HNO_3

b. $AlCl_3$

c. $BeCl_3$

d. NaOH

Q55. Which one o/p but ring deactivator?

a. Cl

b. R

c. -OH

d. -NH2

PATHO TO PERIO
PP
MAKE TODAY COUNT.

Q56. Friedel craft reaction is less useful because:

a. Reaction does not stop at monoalkylation

b. It gives more side product

c. Very slow reaction

d. None of these

Q57. Ortho/para orienting groups activate benzene ring because of:

a. More electronic density at o/p

b. Stability of Arenium ion

c. Both a & b

d. None of these

Q58) Which of the following is more reactive:

a. Nitrobenzene

b. Phenol

c. Benzoic acid

d. Acetophenone

Q59. Which of the following is o/p but deactivating:

a.–OH

b. NH_2

c. OCH_3

d. Cl

Q60. The group that deactivates the benzene ring for electrophilic substitution is:

a. Amino

b. Chlorine

c. Methyl

d. Hydroxy

Q61. Benzene preferably undergoes substitution rather than addition reactions because:

PATHO TO PERIO
PP
MAKE TODAY COUNT.

a. Substitution reactions take place at normal conditions.

b. Addition reactions take place at high temperatures and pressures.

c. Addition products are poisonous and difficult to handle properly.

d. Addition products are unstable and non-aromatic while substitution products are stable and aromatic.

Q62. A process of an electrophilic substitution reaction of benzene that gives polysubstituted product is:

a. Nitration

b. Acylation

c. Alkylation

d. Halogenation

Q63. Benzene can't undergo reactions

a. Substitution

b. Elimination

c. Oxidation

d. Addition

Q64. Benzene behaves like an unsaturated hydrocarbon in its reaction with:

a. Fuming H_2SO_4

b. Nitrating mixture

c. Chlórine in presence of FeCl_3

d. Chlorine in presence of UV-light

Q65. Which of the following is correct priority list for functional group:

a. COOH > CN > CHO > OH

PATHO TO PERIO
PP
MAKE TODAY COUNT.

b. OH > CHO > CN > COOH

c. CHO > OH > COOH > CN

d. CN > COOH > OH > CHO

Q66. The contribution of the canonical forms in the real structure depends on their;

a. Stability

b. Number of a bonds

c. Position of a electrons

d. All of these

Q67. Which of the following is less reactive?

a. Alkynes

b. Alkene

c. Benzene

d. Alcohol

Q68. Propene and cyclo propane exhibit:

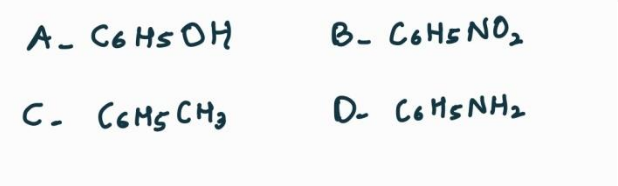
a. Metamerism

b. Chain isomerism

c. Ring chain isomerism

d. Tautomerism

Q69. A derivative of benzene, which is least reactive towards electrophilic substitution reaction, is:



A- C_6H_5OH B- $C_6H_5NO_2$

C- $C_6H_5CH_3$ D- $C_6H_5NH_2$

PATHO TO PERIO
MAKE TODAY COUNT.

Q70. The resulting benzenonium ion is more stable when an electrophile attacks benzaldehyde at:

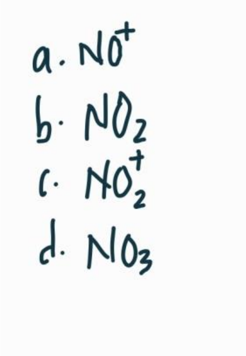
a. o-position

b. m-position

c. p-positon

d. None of these

Q71. During nitration of benzene, the nitrating agent is:



a. NO^+

b. NO_2

c. NO_2^+

d. NO_3

PATHO TO PERIO
MAKE TODAY COUNT

Q72. Aromatic hydro carbons burn with sooty flame because:

a. They have better burning capacity than aliphatic hydrocarbons

b.They have high percentage of carbon

c. They have a cyclic structure

d. They have very low percentage of carbon and hydrogen

Q73. Resonating structures of a resonance hybrid have different:

a. Masses

b. Positions of atoms

c. Number of sigma bonds

d. Arrangement of n-electrons

Q74. Aromaticity of Benzene is due to:

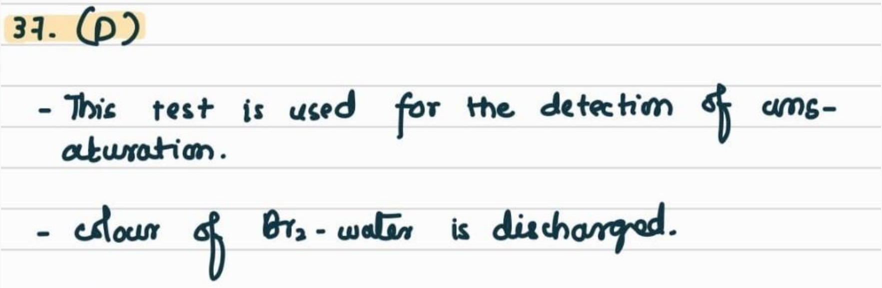
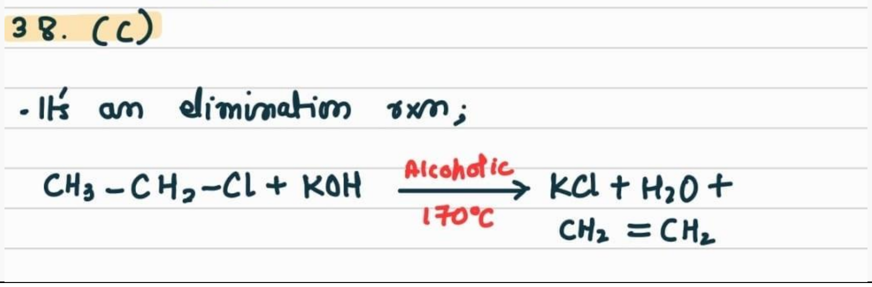
a. Presence of sigma bonds

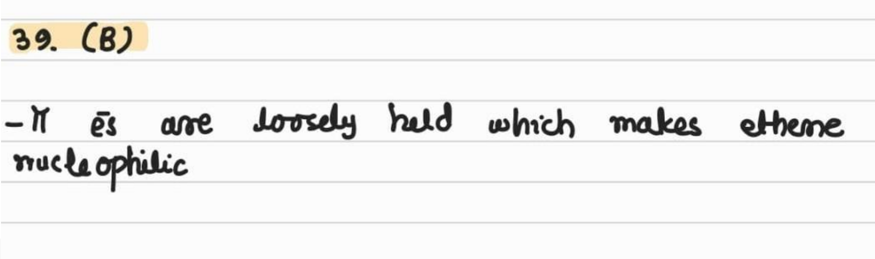
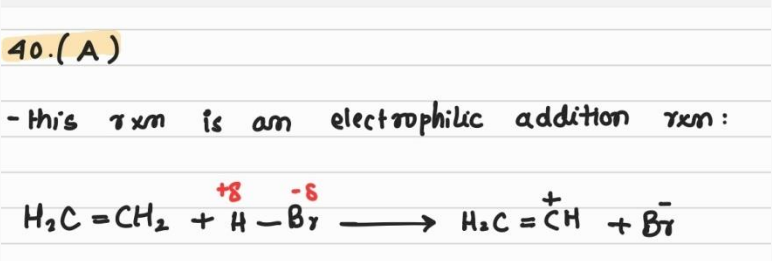
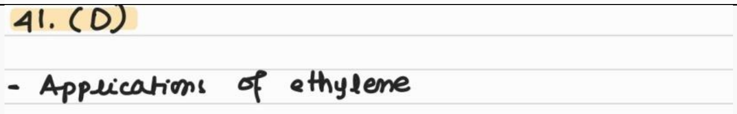
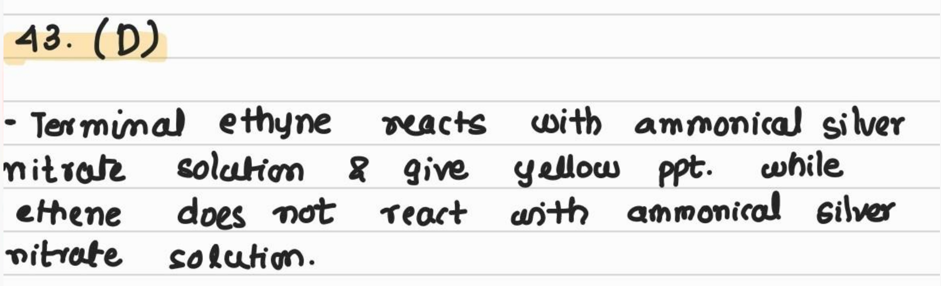
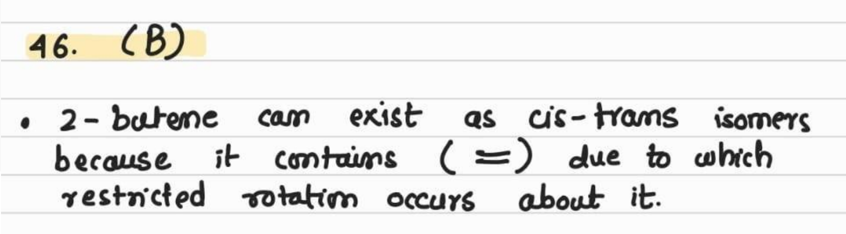
b. Delocalization of Pi electrons

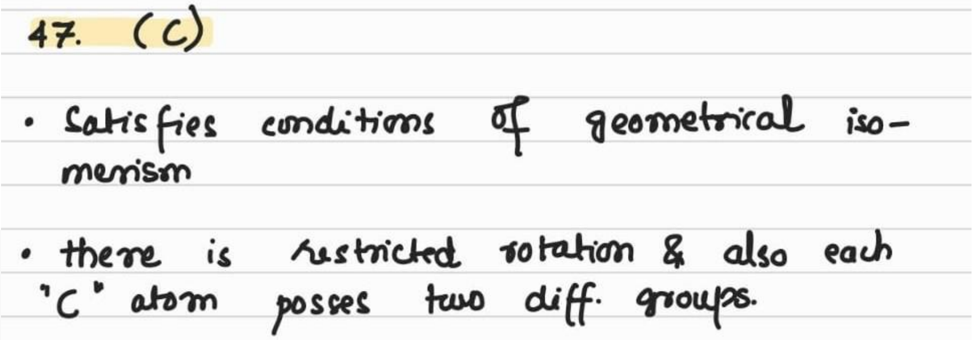
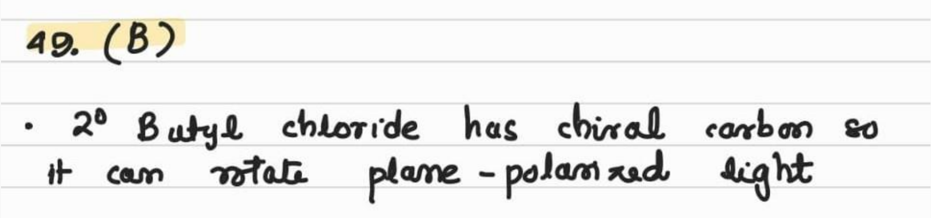
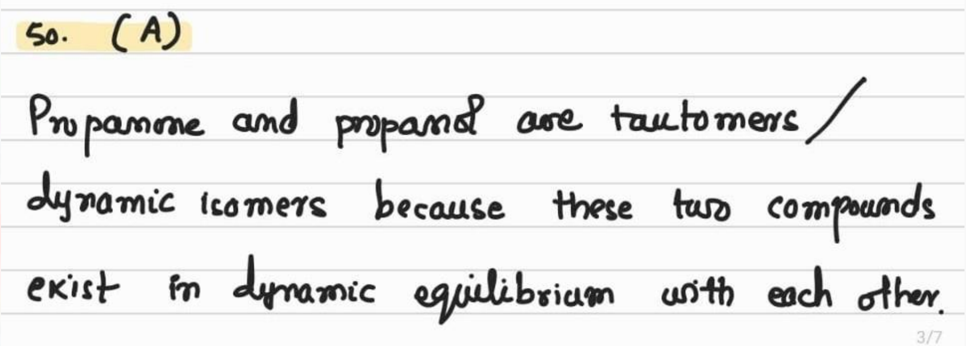
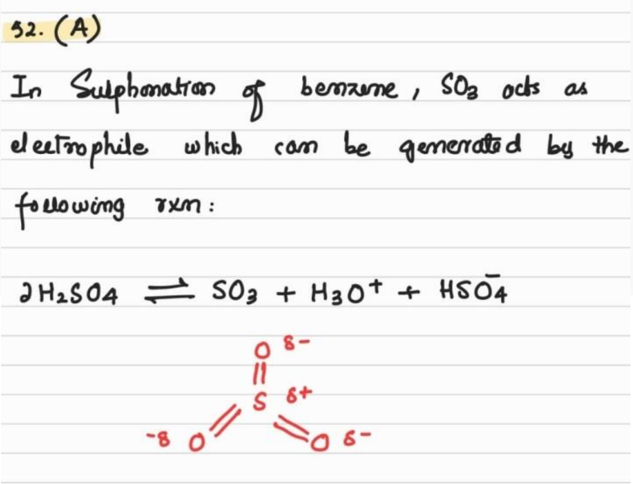
c. Ring structure

d. Three double bonds

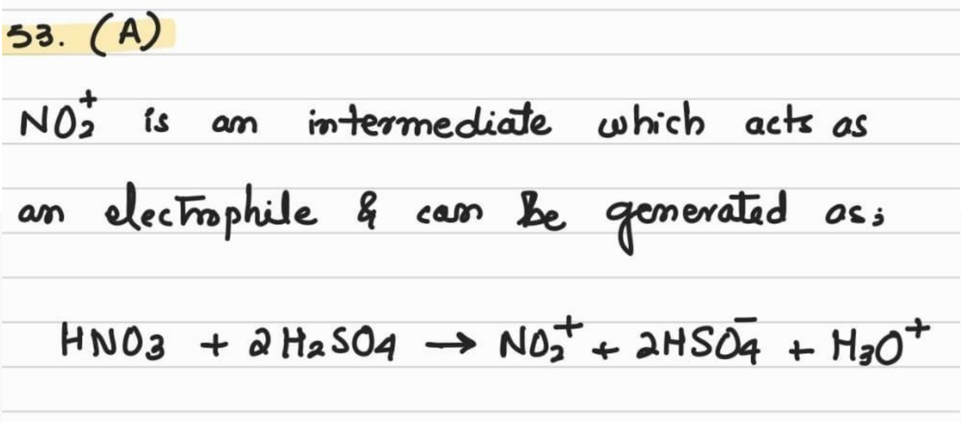
"EXPLANATION OF MCQ's"

MCQ's No	Correct Option	EXPLANATION
36.	A	 36. (A) - $C_4 - C_{18}$ are liquids. - Alkene decolourizes aq. Br_2 water
37.	D	 37. (D) - This test is used for the detection of unsaturation. - colour of Br_2-water is discharged.
38.	C	 38. (C) - It's an elimination rxn; $CH_3-CH_2-Cl + KOH \xrightarrow[170^\circ C]{\text{Alcoholic}} KCl + H_2O + CH_2=CH_2$

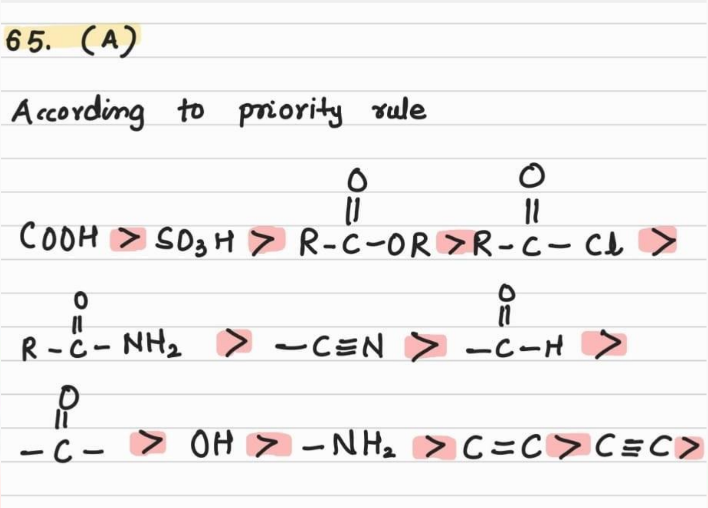
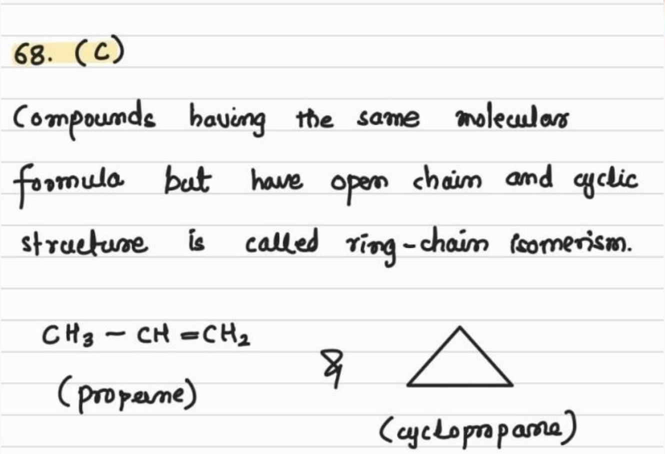
39.	B	 39. (B) - π ēs are loosely held which makes ethene nucleophilic
40.	A	 40. (A) - this rxn is an electrophilic addition rxn : $H_2C=CH_2 + \overset{+\delta}{H}-\overset{-\delta}{Br} \longrightarrow H_2C=\overset{+}{C}H + \overset{-}{Br}$
41.	D	 41. (D) - Applications of ethylene
42.	D	 42. (D) - All of these
43.	D	 43. (D) - Terminal ethyne reacts with ammonical silver nitrate solution & give yellow ppt. while ethene does not react with ammonical silver nitrate solution.
44.	C	According to IUPAC rule.
45.	B	In benzene the decolorization of nt-bond occur. This delocalization causes carbon-carbon bond length to be (1.39A°). This value lies between pure C - C bond length 1.54A° and C = C bond length 1.34A°.
46.	B	 46. (B) • 2-butene can exist as cis-trans isomers because it contains (=) due to which restricted rotation occurs about it.

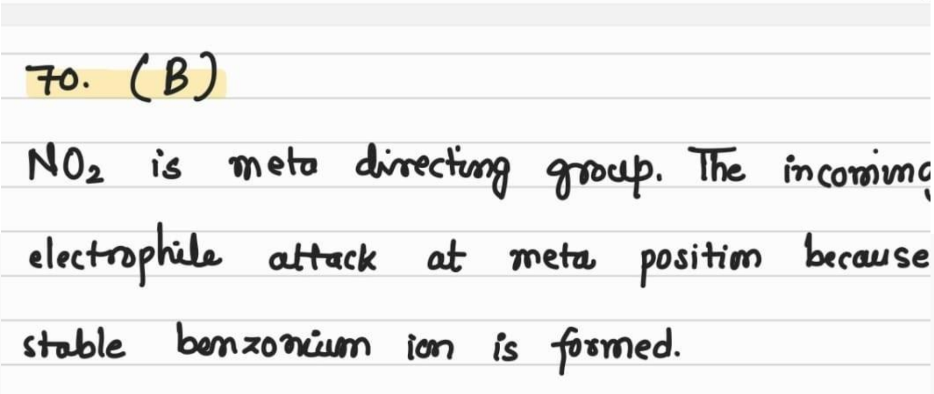
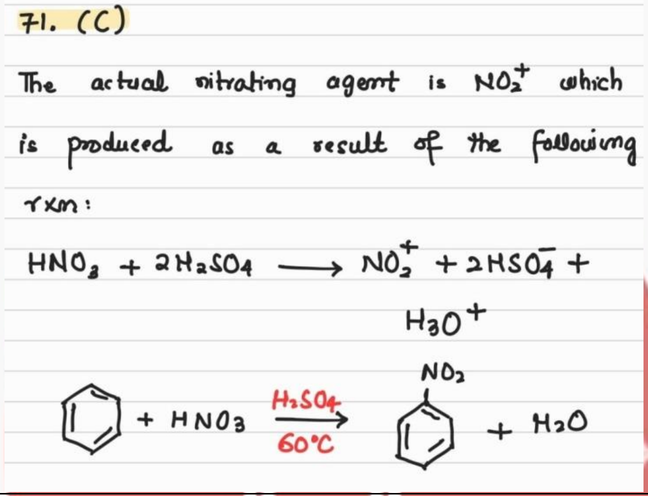
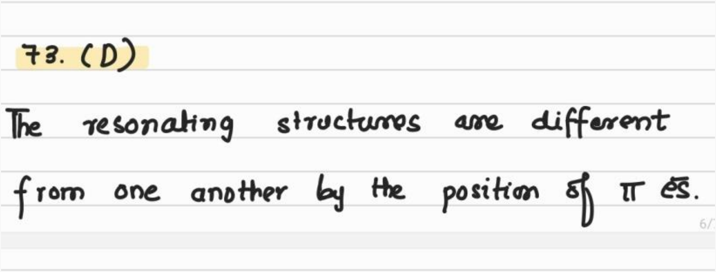
47.	C	 47. (C) • Satisfies conditions of geometrical isomerism • there is restricted rotation & also each "C" atom posses two diff. groups.
48.	C	
49.	B	 49. (B) • 2° Butyl chloride has chiral carbon so it can rotate plane-polarized light
50.	A	 50. (A) Propanone and propanol are tautomers/ dynamic isomers because these two compounds exist in dynamic equilibrium with each other. 3/7
51.	A	Benzene mostly undergo electrophilic substitution reactions under normal condition. But can also undergo oxidation and addition reactions under drastic conditions. It cannot undergo elimination reaction.
52.	A	 52. (A) In Sulphonation of benzene, SO_3 acts as electrophile which can be generated by the following rxn: $2H_2SO_4 \rightleftharpoons SO_3 + H_3O^+ + H\bar{S}O_4$

MAKE TODAY COUNT

53.	A	 53. (A) NO_2^+ is an intermediate which acts as an electrophile & can be generated as: $HNO_3 + 2H_2SO_4 \rightarrow NO_2^+ + 2HSO_4^- + H_3O^+$
54.	B	Lewis acids are used in F.C alkylation and acylation. The most commonly used catalyst is $AlCl_3$.
55.	A	All those substances which have at least one pair of electrons are O/P directing including alkyl groups like ÖH, NH, : X:, R etc. Halogens are ortho/para director but ring deactivator due to strong inductive effect (electron withdrawing effect).
56.	A	Polyalkylation occurs because alkyl group is electron donating group which further increase the reactivity of benzene ring, for further alkylation and hence reaction will not stop on monoalkylated product.
57.	C	Ortho/para directing groups like OH, R, NH2 etc not only increase the electronic density at ortho and para position but can also produce a stable arenium ion. When electrophile attached at ortho or para position.
58.	B	In phenol OH group is attached with benzene ring which is ortho, para and activating group. i.e. OH group increase the reactivity of benzene for substitution reactions because it donate electron to the benzene ring.
59.	D	Halogens are ortho para directing through resonance but deactivating through inductive effect so it withdraws electrons from the benzene ring and deactivates it.
60.	B	Chlorine is O/P directing but it deactivates the ring for electrophilic substitution because of its --I effect as a result it tends to withdraw electrons from the benzene ring and making electrophilic substitution difficult.
61.	D	Benzene does not undergo addition reactions because it disrupts its aromatic character. It undergoes electrophilic substitution reaction which maintain its aromatic character and give more stable product.

PATH TO PERFECTION
MAKE TODAY COUNT

62.	C	Alkylation is the electrophilic substitution reaction which gives polysubstituted product. As alkyl group is activating group which increases the reactivity of benzene for further reactions Nitration, halogenation, etc decrease the reactivity of benzene.
63.	B	Benzene can't undergo elimination reactions because it is a stable compound.
64.	D	In the presence of UV-light benzene give addition reaction with chlorine and hence behave like an unsaturated hydrocarbon.
65.	A	 65. (A) According to priority rule $COOH > SO_3H > R-\overset{\overset{O}{\|}}{C}-OR > R-\overset{\overset{O}{\|}}{C}-Cl >$ $R-\overset{\overset{O}{\|}}{C}-NH_2 > -C\equiv N > -\overset{\overset{O}{\|}}{C}-H >$ $-\overset{\overset{O}{\|}}{C}- > OH > -NH_2 > C=C > C\equiv C >$
66.	A	The more stable is the canonical form. The more will be its contribution in real structure. '
67.	C	Benzene is less reactive due to the delocalization of n-electrons.
68.	C	 68. (C) Compounds having the same molecular formula but have open chain and cyclic structure is called ring-chain isomerism. $CH_3-CH=CH_2$ (propene) & (cyclopropane)
69.	B	Nitrobenzene is least reactive because the nitrogen attached with benzene is a deactivating group and decrease the reactivity of benzene for further substitution reactions.

70.	B	 70. (B) NO_2 is meta directing group. The incoming electrophile attack at meta position because stable benzonium ion is formed.
71.	C	 71. (C) The actual nitrating agent is NO_2^+ which is produced as a result of the following rxn: $HNO_3 + 2H_2SO_4 \longrightarrow NO_2^+ + 2HSO_4^- + H_3O^+$ $+ HNO_3 \xrightarrow[60^\circ C]{H_2SO_4}$ NO_2 $+ H_2O$
72.	B	In aromatic compounds composition of carbon is higher so carbon is not completely oxidized and incomplete combustion occurs.It causes the fornation of an unburnt carbon (soot).
73.	D	 73. (D) The resonating structures are different from one another by the position of π ēs.
74.	B	Conditions for aromaticity (1) The molecule must be cyclic (2) The molecule must obey Huckel's Rule (3) Every atom in the ring must be conjugated (4) The molecule must be planar (5) Delocalization of pie-electrons.