



Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO

Time: 9:00 AM to 12:00 Noon

RPTM-3

Date: 14-08-15

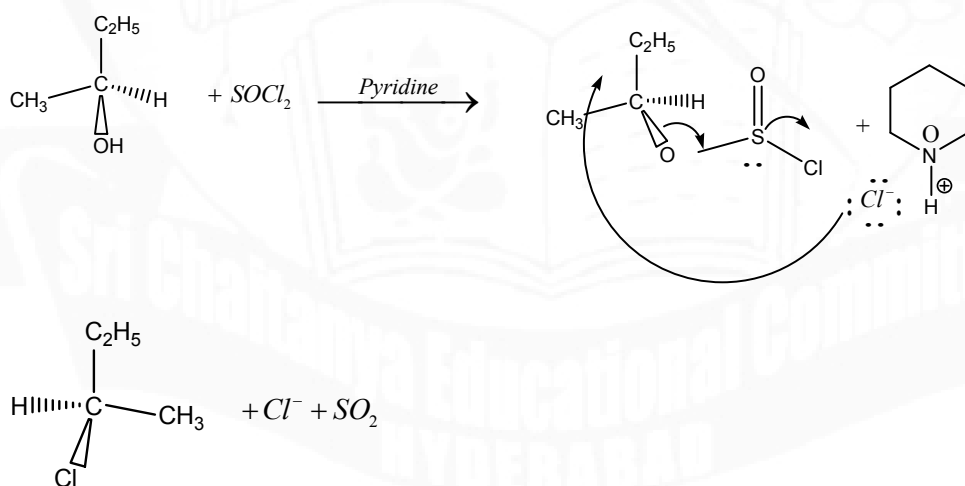
Max.Marks: 360

KEY SHEET

PHYSICS		CHEMISTRY		MATHS	
Q.NO	ANSWER	Q.NO	ANSWER	Q.NO	ANSWER
1	1	31	2	61	3
2	1	32	3	62	1
3	4	33	1	63	2
4	3	34	1	64	1
5	1	35	2	65	2
6	2	36	4	66	3
7	1	37	3	67	2
8	3	38	1	68	4
9	2	39	2	69	4
10	2	40	4	70	2
11	4	41	1	71	2
12	1	42	3	72	4
13	1	43	2	73	3
14	3	44	2	74	3
15	3	45	3	75	2
16	1	46	4	76	3
17	3	47	1	77	3
18	4	48	2	78	1
19	3	49	4	79	3
20	4	50	3	80	3
21	4	51	4	81	2
22	4	52	2	82	2
23	1	53	3	83	2
24	1	54	4	84	2
25	3	55	4	85	1
26	4	56	3	86	1
27	2	57	2	87	3
28	2	58	1	88	3
29	3	59	4	89	1
30	3	60	3	90	2

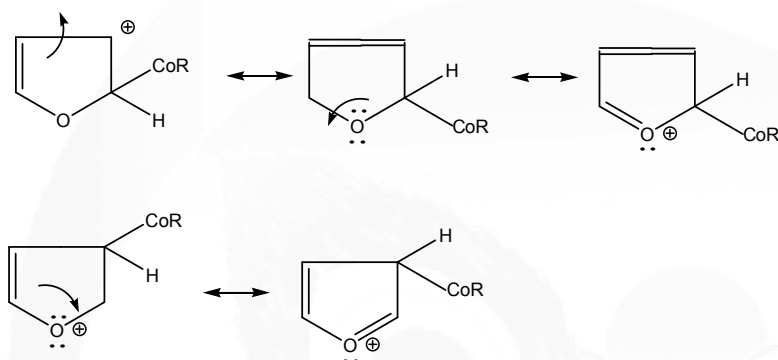
CHEMISTRY

31. The intermediate formed during nucleophilic aromatic halogenides (halogenes) is Meisenheimer complex
32. The transition state is formed soon due to the delocalization of electron cloud of $\begin{array}{c} -C- \\ || \\ O \end{array}$ group in β position
33. Methoxide ion is a better nucleophile as lone pair is in free state. Thiophenoxide anion is a weak base, but not a better nucleophile as charge dissipates over a large area. In aniline lone pair is involved in resonance.
34. The F atom being more electronegative further increases the positive charge formed due to $-M$ effect of NO_2 groups, on the carbon holding it by exerting $-I$ effect. It also does not offer any steric repulsion when nucleophile is connected to the carbon holding it as it is small in size.
35. Isotopic effect appears only when $\begin{array}{c} -C-H \\ | \end{array}$ bond breaks in the slow and rate determining stage it is only E_2 .
- 36.

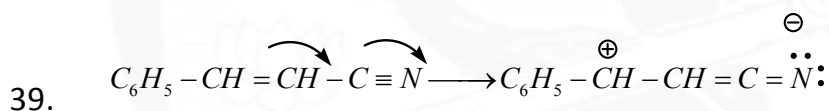


In (a) Br^- is displaced. In the product F becomes first priority group and so no inversion. In (b) no bond around asymmetric carbon breaks so no inversion. (c) is S_N1 and no inversion.

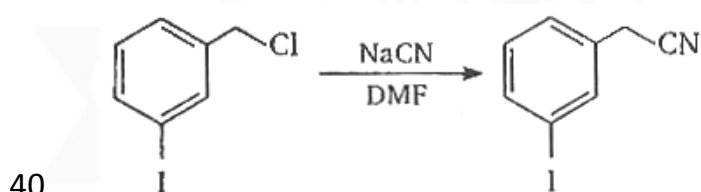
37. If an electrophile is introduced in one of the rings in ortho para positions the positive charge of intermediate spreads into both the rings. So the carbocation is more stabilized and biphenyl becomes more reactive than benzene. The vacant orbital of boron in (a) overlaps with ring π bonds and deactivates the ring. Same is the case with (b). (c) has a deactivated ring due to -M effects exerted by $-\text{NO}_2$ group.
38. The carbocation formed when substitution takes place at C_2 is more stable than the one formed when it takes place at C_3 . There is no C_4 .



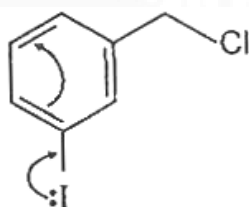
Only one resonating structure



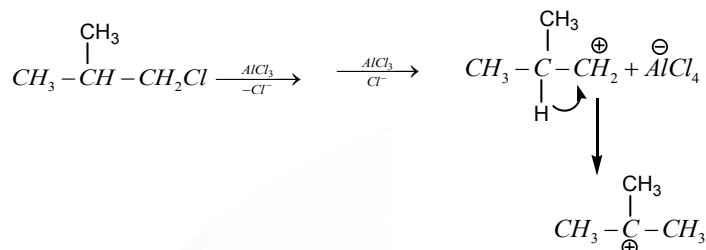
The positive charge formed on carbon due to resonance makes the group meta orienting as ring is deactivated. Others are o,p-orientating groups



Chloride is on 1° aliphatic carbon which is substituted easier in comparison to iodide which is aryllic and more stable due to delocalisation hence difficult to substitute.



41. F being more electronegative exerts strong $-I$ effect on the adjacent ortho carbon. So the density of π electron cloud decreases at ortho position to a greater extent percentage of o-nitro fluorobenzene decreases O/p ratio decreases.

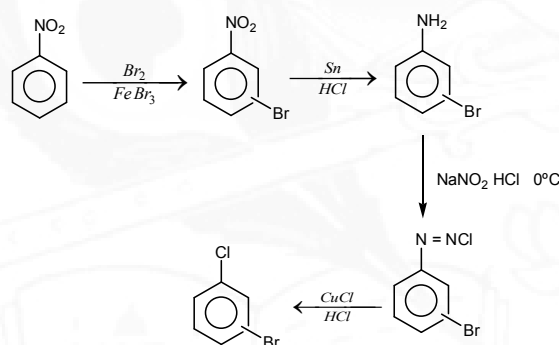


42.

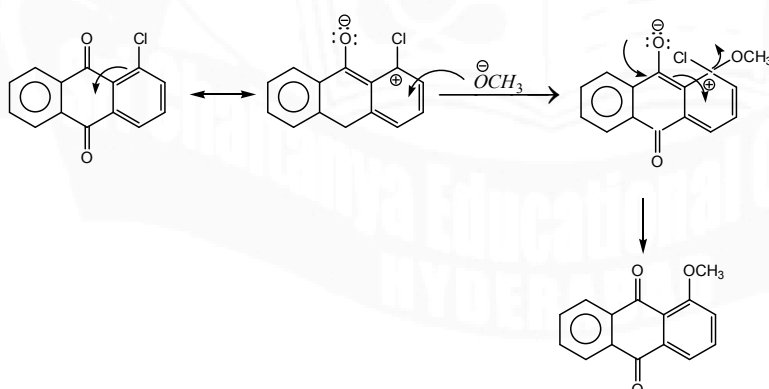
Tert butyl group is introduced in para-position in greater proportion to avoid steric repulsion.

43. The intermediate carbo cation formed from (b) during $\text{S}_\text{N}1$ is aromatic and more stable and more easily formed. The carbo cation formed from (A) is anti aromatic

44.

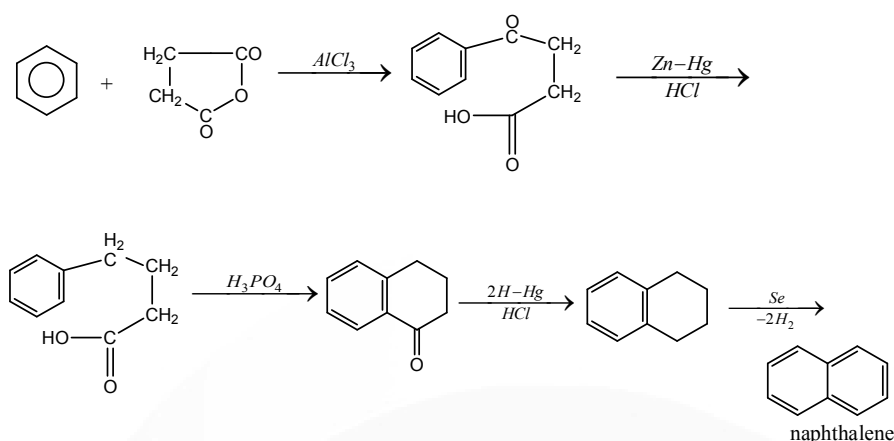


45.



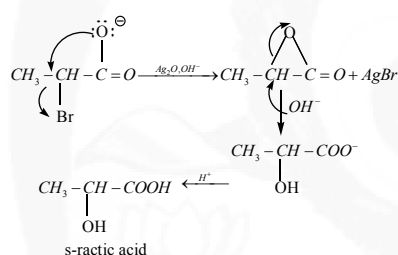
46. The yellow precipitate is iodoform only (d) gives it
47. Even though F exerts strong $-I$ effect it exerts $+M$ effect also when compared to other halogens easily as it is small. So it is more reactive.

48.



49. It is tertiary at one end even though it is allyl chloride. The carbocation is stabilized by both resonance and hyper conjugation and more easily formed

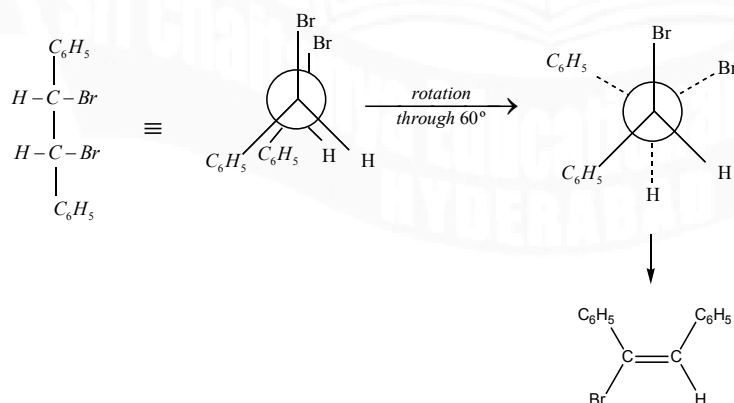
50. It is an example of neighbouring group participation.



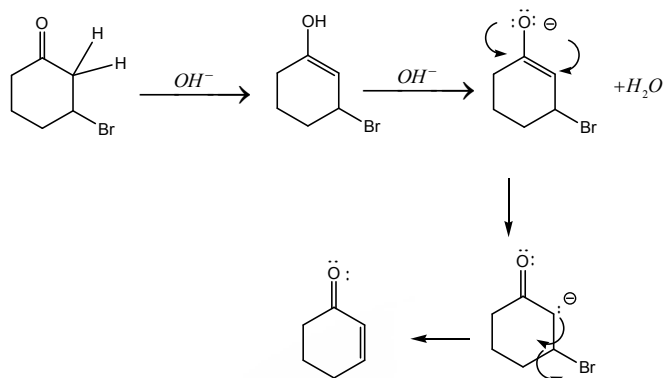
Two inversions make no inversion

51. t-butoxide is a bulky and strong base and affects Hofmann elimination. Hence least substituted alkene is formed.

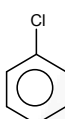
52.



53. It is an example of E_1 cb reaction



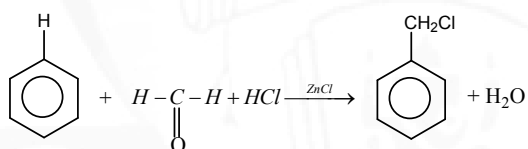
54. Alkyl groups exert + I but not + M or - M

55.  gives ortho, meta, para substituted products

 gives 3 trisubstitution products when one more substituent is introduced

56. $\text{C}_6\text{H}_5 - \text{N} = \text{N}^+ \text{Cl}^- \xrightarrow[\text{H}_2\text{O}]{\text{H}_3\text{PO}_2} \text{benzene}$

57. It is chloro methylation



58. Aliphatic halogen derivatives are more reactive than aromatic halogen derivatives

59. Chlorobenzene is prepared on a large scale by Raschig process

60. Oxidation of side chain in arenes requires at least one H on benzylic carbon. Otherwise oxidation of side chain does not take place.