

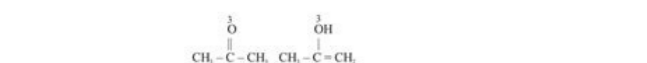
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These structures are hybrid in explanation of chemical reactivity or the chemical reaction of the compound
 Both who are not resonance phenomenon in the level of resonance, effect or delocalisation.

- Resonating structures are not the real structures of conjugated compounds.
- The real structure of conjugated compound is a hybrid of all resonating structures. The phenomenon is known as resonance, mesomerism or delocalisation.
- This resonance is nothing but hybridisation of resonating structures and resonance phenomenon will take place in conjugated compounds.

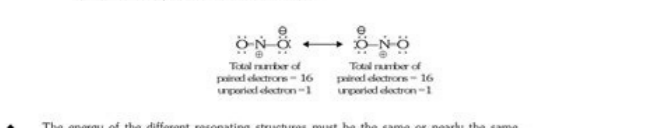
Conditions of Resonating Structures : Resonance structures should follow following conditions :

- All resonating structures must have the same arrangement of atomic nuclei. Resonance differs from isomerism in this very important aspect.



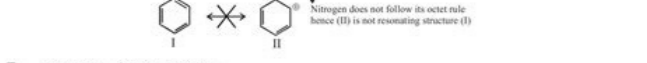
Position of hydrogen nuclei in B and D) are different, hence B and D) are not resonating structures, they are isomers.

- The resonating structures must have the same numbers of paired and unpaired electrons. However, they differ in the way of distribution of electrons.



- The energy of the different resonating structures must be the same or nearly the same.
- All atoms that are part of the delocalisation system must be in a plane or be nearly plane.

- All atoms of the resonating structure should follow the octet rule.
 For Example: All atoms follow octet rule.



- Conditions for resonance :

- If there are two or more atoms at alternate position then or if one s bond are transferred towards another s bond. (According to s-effect).

7. VALUES OF T-RATIOS OF SOME STANDARD ANGLES :

Angles	0	30	45	60	90	180	270
T-ratio	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	π	$3\pi/2$
sin θ	0	1/2	$1/\sqrt{2}$	$\sqrt{3}/2$	1	0	-1
cos θ	1	$\sqrt{3}/2$	$1/\sqrt{2}$	1/2	0	-1	0
tan θ	0	$1/\sqrt{3}$	1	$\sqrt{3}$	N.D.	0	N.D.
cot θ	N.D.	$\sqrt{3}$	1	$1/\sqrt{3}$	0	N.D.	0
sec θ	1	$2/\sqrt{3}$	$\sqrt{2}$	2	N.D.	-1	N.D.
cosec θ	N.D.	2	$\sqrt{2}$	$2/\sqrt{3}$	1	N.D.	-1

- N.D. \rightarrow Not Defined
- (a) $\sin n\pi = 0$; $\cos n\pi = (-1)^n$; $\tan n\pi = 0$ where $n \in \mathbb{I}$
- (b) $\sin(2n+1)\frac{\pi}{2} = (-1)^n$; $\cos(2n+1)\frac{\pi}{2} = 0$ where $n \in \mathbb{I}$

Illustration 4 : If $\sin \theta = -\frac{1}{2}$ and $\tan \theta = \frac{1}{\sqrt{3}}$ then θ is equal to -
 (A) 30 (B) 150 (C) 210 (D) none of these

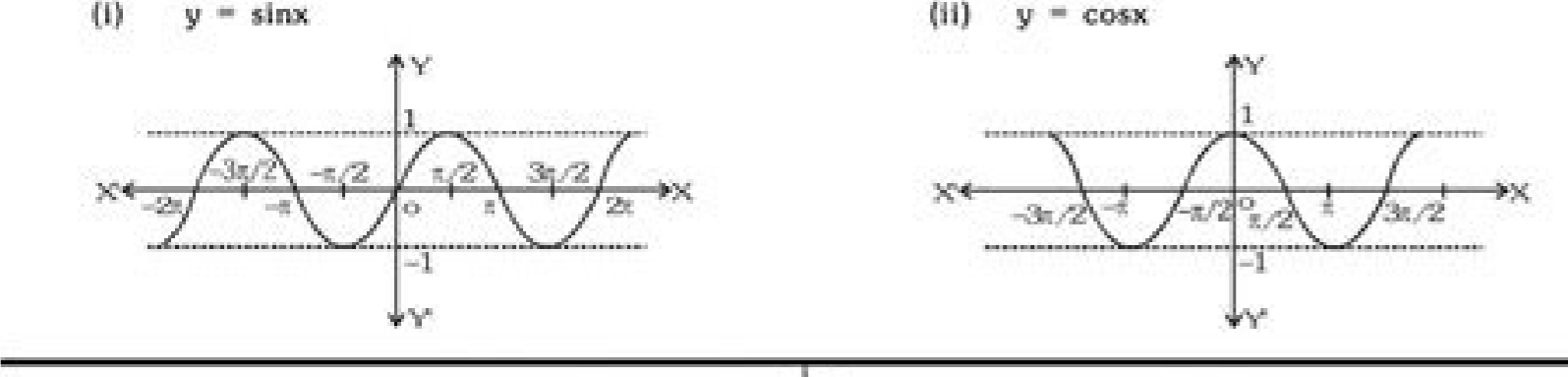
Solution : Let us first find out θ lying between 0 and 360 .
 Since $\sin \theta = -\frac{1}{2} \Rightarrow \theta = 210$ or 330 and $\tan \theta = \frac{1}{\sqrt{3}} \Rightarrow \theta = 30$ or 210
 Hence , $\theta = 210$ or $\frac{7\pi}{6}$ is the value satisfying both. **Ans. (C)**

Do yourself - 3 :

(i) If $\cos \theta = -\frac{1}{2}$ and $\pi < \theta < \frac{3\pi}{2}$, then find the value of $4\tan^2\theta - 3\text{cosec}^2\theta$.

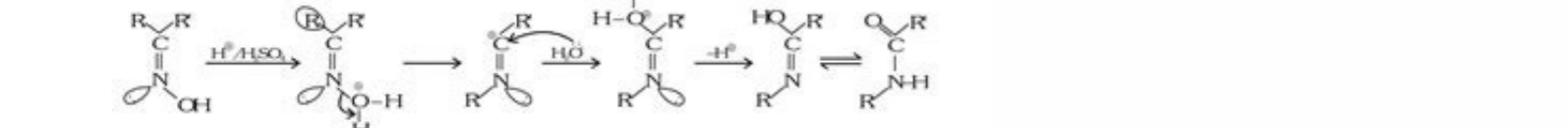
(ii) Prove that : (a) $\cos 570 \sin 510 + \sin(-330) \cos(-390) = 0$
 (b) $\tan \frac{11\pi}{3} - 2 \sin \frac{9\pi}{3} - \frac{3}{4} \text{cosec}^2 \frac{\pi}{4} + 4 \cos^2 \frac{17\pi}{6} = \frac{3-2\sqrt{3}}{2}$

8. GRAPH OF TRIGONOMETRIC FUNCTIONS :

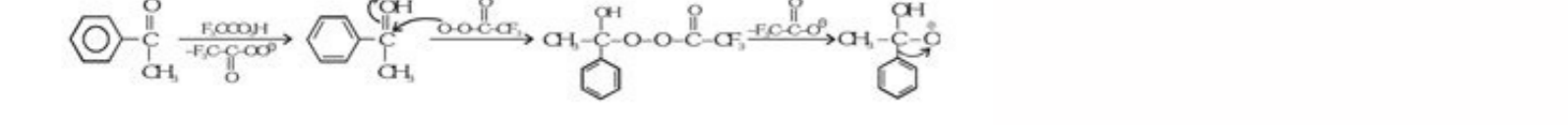
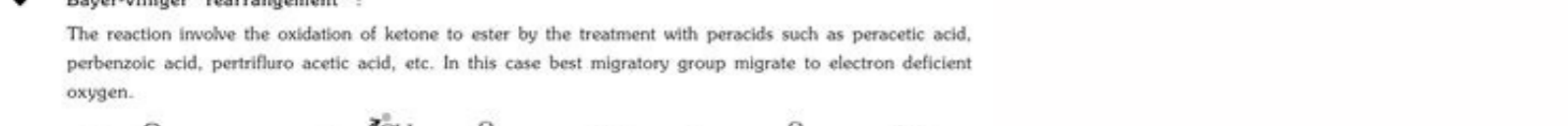


(IV) Rearrangement reaction :

It may be defined as the reaction involving reshuffling of the sequence of atom to form a new structure:



In this reaction ketoxime reacts with $\text{H}_2\text{SO}_4(\text{conc.})$ to give a product by alkyl migration.



Migratory order : $3 > 2 > 1 > \text{CH}_3$
 $\text{CH}_3\text{O} > \text{C}_6\text{H}_5 > \text{CH}_3 > \text{Cl} > \text{O} > \text{N} > \text{C}_6\text{H}_5$

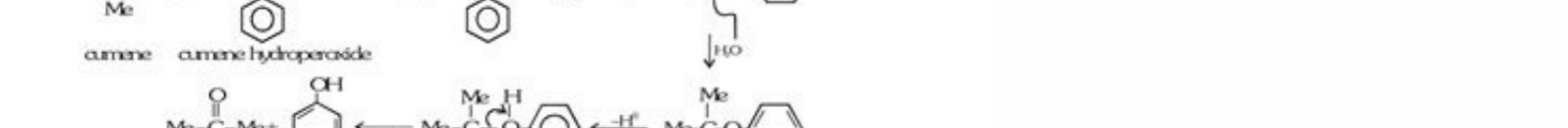
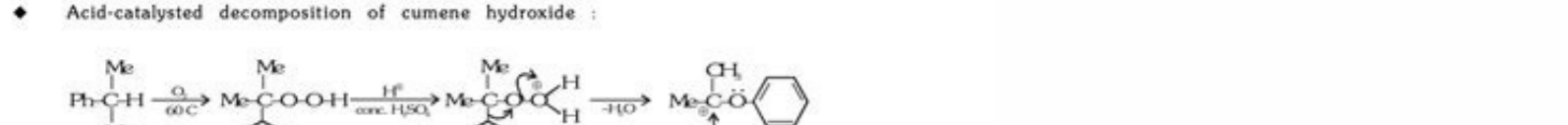


Table 10.1 Atomic and Physical Properties of the Alkali Metals

Property	Lithium Li	Sodium Na	Potassium K	Rubidium Rb	Caesium Cs	Francium Fr
Atomic number	3	11	19	37	55	87
Atomic mass (g mol ⁻¹)	6.94	22.99	39.10	85.47	132.91	(223)
Electronic configuration	[He] 2s ¹	[Ne] 3s ¹	[Ar] 4s ¹	[Kr] 5s ¹	[Xe] 6s ¹	[Rn] 7s ¹
Ionization enthalpy / kJ mol ⁻¹	520	496	419	403	376	~375
Hydration enthalpy/kJ mol ⁻¹	-506	-406	-330	-310	-276	-
Metallic radius / pm	152	186	227	248	265	-
Ionic radius M ⁺ / pm	76	102	138	152	167	(180)
m.p. / K	454	371	336	312	302	-
b.p. / K	1615	1156	1032	961	944	-
Density / g cm ⁻³	0.53	0.97	0.86	1.53	1.90	-
Standard potentials E ⁰ / V for (M ⁺ / M)	-3.04	-2.714	-2.925	-2.930	-2.927	-
Occurrence in lithosphere [†]	18*	2.27**	1.84**	78-12*	2-6*	~ 10 ⁻¹⁸ *

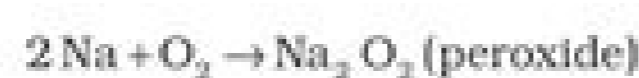
*ppm (part per million), ** percentage by weight; † Lithosphere: The Earth's outer layer; its crust and part of the upper mantle

This property makes caesium and potassium useful as electrodes in photoelectric cells.

10.1.6 Chemical Properties

The alkali metals are highly reactive due to their large size and low ionization enthalpy. The reactivity of these metals increases down the group.

(i) **Reactivity towards air:** The alkali metals tarnish in dry air due to the formation of their oxides which in turn react with moisture to form hydroxides. They burn vigorously in oxygen forming oxides. Lithium forms monoxide, sodium forms peroxide, the other metals form superoxides. The superoxide O₂⁻ ion is stable only in the presence of large cations such as K, Rb, Cs.



(M = K, Rb, Cs)

In all these oxides the oxidation state of the alkali metal is +1. Lithium shows exceptional behaviour in reacting directly with nitrogen of air to form the nitride, Li₃N as well. Because of their high reactivity towards air and water, alkali metals are normally kept in kerosene oil.

Problem 10.1

What is the oxidation state of K in KO₂?

Solution

The superoxide species is represented as O₂⁻; since the compound is neutral, therefore, the oxidation state of potassium is +1.

2019-20

Subnetting Cheat Sheet

CIDR	SUBNET MASK	ADDRESSES	WILDCARD MASK
/32	255.255.255.255	1	0.0.0.0
/31	255.255.255.254	2	0.0.0.1
/30	255.255.255.252	4	0.0.0.3
/29	255.255.255.248	8	0.0.0.7
/28	255.255.255.240	16	0.0.0.15
/27	255.255.255.224	32	0.0.0.31
/26	255.255.255.192	64	0.0.0.63
/25	255.255.255.128	128	0.0.0.127
/24	255.255.255.0	256	0.0.0.255
/23	255.255.254.0	512	0.0.1.255
/22	255.255.252.0	1024	0.0.3.255
/21	255.255.248.0	2048	0.0.7.255
/20	255.255.240.0	4096	0.0.15.255
/19	255.255.224.0	8192	0.0.31.255
/18	255.255.192.0	16384	0.0.63.255
/17	255.255.128.0	32768	0.0.127.255
/16	255.255.0.0	65536	0.0.255.255
/15	255.254.0.0	131072	0.1.255.255
/14	255.252.0.0	262144	0.3.255.255
/13	255.248.0.0	524288	0.7.255.255
/12	255.240.0.0	1048576	0.15.255.255
/11	255.224.0.0	2097152	0.31.255.255
/10	255.192.0.0	4194304	0.63.255.255
/9	255.128.0.0	8388608	0.127.255.255
/8	255.0.0.0	16777216	0.255.255.255
/7	254.0.0.0	33554432	1.255.255.255
/6	252.0.0.0	67108864	3.255.255.255
/5	248.0.0.0	134217728	7.255.255.255
/4	240.0.0.0	268435456	15.255.255.255
/3	224.0.0.0	536870912	31.255.255.255
/2	192.0.0.0	1073741824	63.255.255.255
/1	128.0.0.0	2147483648	127.255.255.255
/0	0.0.0.0	4294967296	255.255.255.255

Classful IPv4 Addresses	
Class A	0.0.0.0 - 127.255.255.255
Class B	128.0.0.0 - 191.255.255.255
Class C	192.0.0.0 - 223.255.255.255
Class D	224.0.0.0 - 239.255.255.255
Class E	240.0.0.0 - 255.255.255.255

Private IPv4 Addresses	
10.0.0.0 - 10.255.255.255	
172.16.0.0 - 172.31.255.255	
192.168.0.0 - 192.168.255.255	

Special IPv4 Addresses	
Local Host	127.0.0.0 - 127.255.255.255
APIPA	169.254.0.0 - 169.254.255.255

Bogon IPv4 Addresses	
0.0.0.0/8	This network
10.0.0.0/8	Private IPv4 Address Block
100.64.0.0/10	Carrier-grade NAT
127.0.0.0/8	Loopback
127.0.53.53	Name collision occurrence
169.254.0.0/16	Link local
172.16.0.0/12	Private IPv4 Address Block
192.0.0.0/24	IETF protocol assignments
192.0.2.0/24	TEST-NET-1
192.168.0.0/16	Private IPv4 Address Block
198.18.0.0/15	Network benchmark testing
198.51.100.0/24	TEST-NET-2
203.0.113.0/24	TEST-NET-3
224.0.0.0/4	Multicast
240.0.0.0/4	Reserved
255.255.255.255/32	Limited broadcast

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using real-world demonstrations, animations, and configurations. Two additional options are CBT Nuggets and Udemy. CBT Nuggets' Cisco Certified Associate (200-301 CCNA) Online Training consists of 58 hours of training, including 434 videos, 56 virtual labs and one practice exam to prepare for the CCNA exam. Udemy's CCNA 200-301 Full Certification Prep Course includes 10 hours of on-demand videos, 24 articles, and 99 downloadable resources. Practicing all labs found in course materials Many exam questions will involve solving networking problems based on real-world scenarios. Thus, your study plan should include hands-on practice labs to reinforce your learning. Watching labs on video or reading about them will not ensure your learning unless you practice them yourself. The most efficient way to learn is to practice labs on actual Cisco devices. Barring that, here are two ways to practice the labs without purchasing your own equipment. Cisco Packet Tracer Cisco Packet Tracer is a free, downloadable network simulation tool where you can practice your networking skills in a virtual lab - no hardware needed. Packet Tracer gives you access to simulated Cisco equipment and the Cisco IOS operating system, where you can practice working with the networking concepts covered in the CCNA exam. You can add, delete and configure basic devices and connections, such as a router, switch, PC, straight through and crossover cables and a console cable. Packet Tracer also includes all the commands you need to know for the exam. To help you understand the processes behind the commands, you should consider obtaining a CCNA commands guide such as Cisco CCNA Command Guide: A Comprehensive Beginner's Guide from A-Z for CCNA and Computer Networking Users by Stuart Nicholas. Packet Tracer also includes all the commands you will need to know for the exam. To help you understand the processes behind the commands, you should consider obtaining a CCNA commands guide such as Cisco CCNA Command Guide: A Comprehensive Beginner's Guide from A-Z for CCNA and Computer Networking Users by Stuart Nicholas. Cisco Learning Labs - CCNA v1.0 Cisco Learning Labs consists of a full set of Cisco IOS Software labs specifically developed to help students prepare for the CCNA (200-301) exam. It provides 60 hours of lab time to use 24/7 over a 90-day access period. These labs utilize Cisco IOS software with Layer 2 and Layer 3 features and CLI supported on version 15 releases. Incorporating practice exams into the study plan You should take a practice exam as often as possible to test your readiness for the exam and guide you in your studies. For example, taking a practice test about halfway into your studies is a good idea to identify any weak areas that require additional study. Taking as many practice tests as possible will also help you get accustomed to working under the exam's time constraints. Here are four sources of practice tests to choose from : Joining a certification study group You don't have to study alone. You can join an online community where you will be able to meet other candidates and experts with whom you can share knowledge, exam strategies and find answers to your questions. One such community is the CCNA Certification Community on the Cisco Learning Network. Here you can ask questions, share ideas and connect with other members preparing for the CCNA Exam. It also includes links to articles that relate to CCNA prep and exams. See More: CISSP Certification: Exam Cost, Salary, and Jobs in 2022 Final tips For self-study, you should spend 30-60 minutes daily on your course materials, including textbook reading and watching your chosen video course. However, not all your questions will be covered by these resources. You will still need to research further any concept you don't fully understand. Be sure to take full advantage of your practice environment to ensure you understand networking concepts and how the Cisco interface and its commands and syntax are used in network configuration, operation and troubleshooting. Finally, it would help if you allocated time in your study schedule for exam review, preferably during the month preceding the exam. Allow yourself enough time to go over practice tests and review study materials to reinforce your knowledge of the exam topics. You should also give yourself time to have any last-minute questions answered through your online community or research on the Web. What are some of your best CCNA test preparation tips? Tell us on Facebook, Twitter, and LinkedIn. We'd love to hear from you! MORE ON NETWORKING Welcome to the free Cisco CCNA study guide. 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