



MUGBERIA GANGADHAR MAHAVIDYALAYA

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NAAC Re-Accredited B+Level Govt. aided College

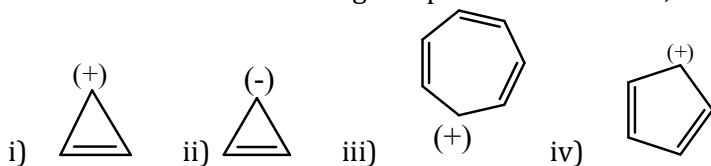
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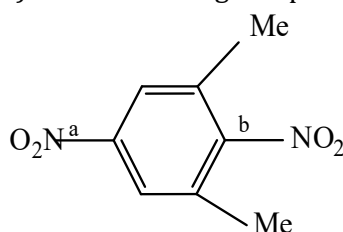
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Fundamental Organic Chemistry (SEM - 1)

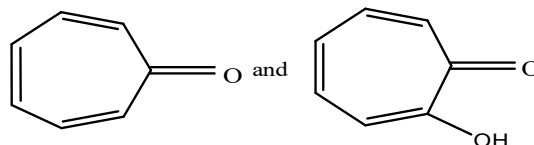
1. Draw the orbital picture of the following compounds indicating the state of hybridization in each carbon atom. (any one) i) $\text{CH}_2=\text{CHCN}$ ii) $\text{CH}_2=\text{C}=\text{O}$
2. Explain why C2-C3 bond length in propene is smaller than the C-C bond length of propane.
3. Predict which of the following compounds is aromatic, antiaromatic or nonaromatic?



4. Which C—N bond (a or b) of the following compound has higher bond energy and why?



5. Azulene has an unexpectedly high dipole moment - Explain?
6. Compare the dipole moment of



7. The tertiary amine $(\text{CF}_3)_3\text{N}$ has practically no basic character. - Explain
8. Distinguish with an appropriate example ---

Hyperconjugation and Conjugation

9. Draw the orbital picture of the following compound indicating the state of Hybridization in each carbon and oxygen atom: $\text{CH}_3-\text{CH}=\text{C}=\text{O}$
10. What is the difference between Resonance and Tautomerism? Explain with suitable example.
11. Arrange the following compounds in order of increasing acidity. Give reason for your answer.
 $\text{CH}_2=\text{CH}-\text{COOH}$, $\text{CH}\equiv\text{C}-\text{COOH}$, $\text{CH}_3\text{CH}_2\text{COOH}$
12. Draw all the π - molecular orbitals of buta-1,3-diene . Indicate the highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) in the ground state of buta-1,3-diene .
13. Arrange the following in order of increasing stability ----
Benzyl cation , Allyl cation , isopropyl cation , tert- butyl cation.
14. Explain - Cyclohexyl amine is a stronger base than aniline.
15. Which of $\text{CH}_2\text{Br}-\text{CH}_2\text{Br}$ and $\text{CH}_2(\text{OH})-\text{CH}_2\text{OH}$ has higher dipole moment? Explain.

17. Arrange the following compounds in order of increasing heat of hydrogenation with reason:
1-butene, E-2-butene, Z-2-butene

18. Calculate the double bond equivalent (D.B.E.) of the following : $C_5H_{12}O$

19. What are the differences between basicity and nucleophilicity? Explain with relevant Examples.

20. Compare the basic strengths of triethylamine and quinuclidine.

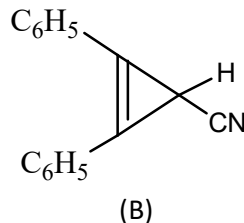
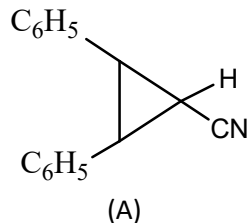
21. Arrange the following Compounds in order of increasing acid strength and give reason for Your answer.

2-hydroxybenzoic acid, 4-hydroxybenzoic acid, 2,6-dihydroxybenzoic acid .

22. Explain why guanidine is a strong mono acidic base. [Structure of guanidine, $HN=C(NH_2)_2$]

23. Depict the molecular orbital diagrams of a singlet carbene having sp^2 – hybridization as well as sp – hybridization.

24. The cyclopropane (A) loses its proton in hydrogen exchange reactions $\sim 10,000$ times faster than the cyclopropene (B) – Explain.

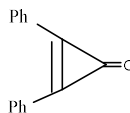


25. Arrange the following Compounds in increasing order of acid strength and explain.

i) 4-nitrophenol ii) 2,6-dimethyl-4-nitrophenol iii) 3,5-dimethyl-4-nitrophenol

26. 2,6-Di-*t*-butylpyridine is a specific proton scavenger - Explain .

27. Compare C=O bond distance in $Me_2C=O$, RCO_2^- and



28. Which of the following two canonicals has greater contributions towards the resonance hybrid?

