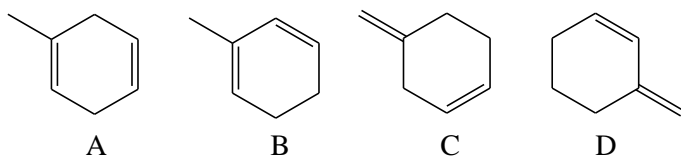


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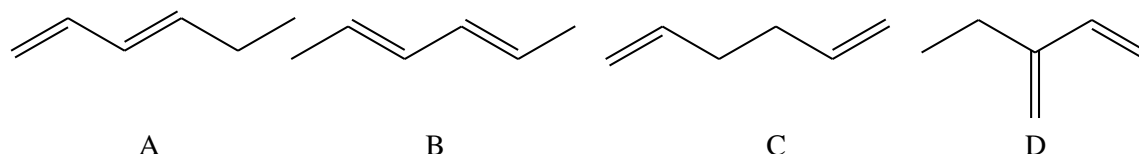
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1. Select the most stable dienes structure in each set. Circle the correct one in each set.

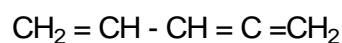
Part A.



Part B.



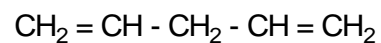
Part C.



A

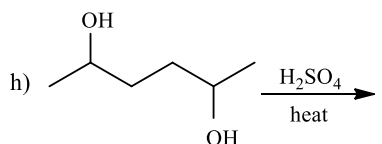
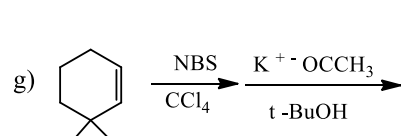
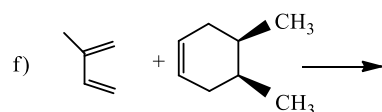
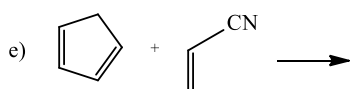
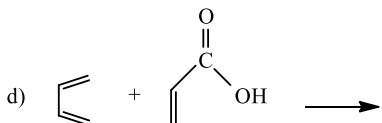
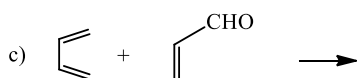
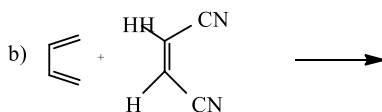
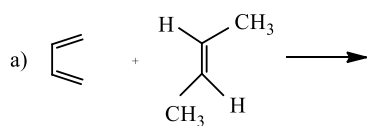


B



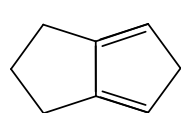
C

2. Select the major product from the structures below for the reactions shown:

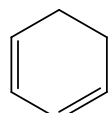


3. Which of the following dienes **CAN NOT** be used as the component in a Diels Alder Reaction?

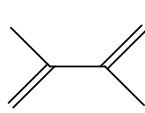
(You may check more than one):



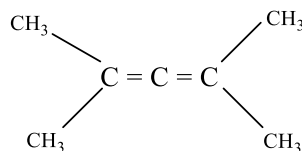
A



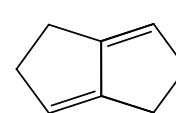
B



C

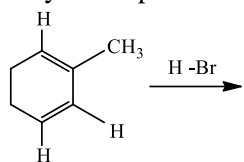


D

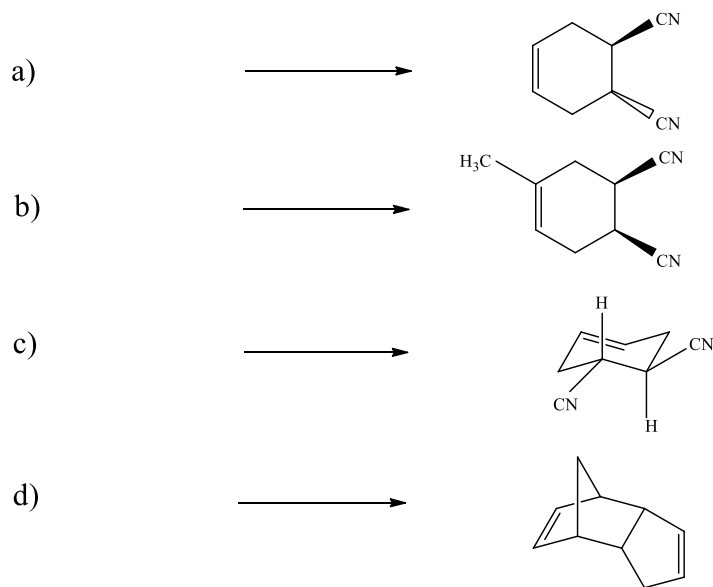


E

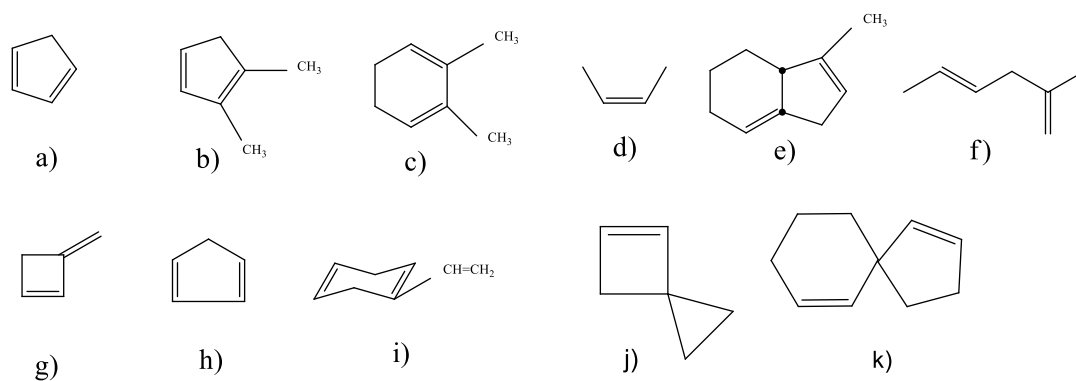
4. Write a complete mechanism for the following reaction and explain kinetic product stability vs thermodynamic product stability.



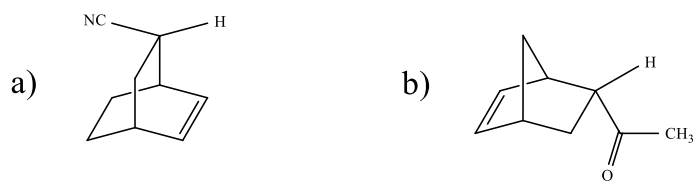
5. Using a **cyclo addition** reaction (4+2), suggest a synthesis for each of the molecules shown below, paying very careful attention to stereochemistry.



6. Give the proper **IUPAC** name for each of the compound shown below.



7. Using a **(4+2) cyclo addition reaction**, suggest a synthesis for each of the molecules below, paying very careful attention to stereochemistry.



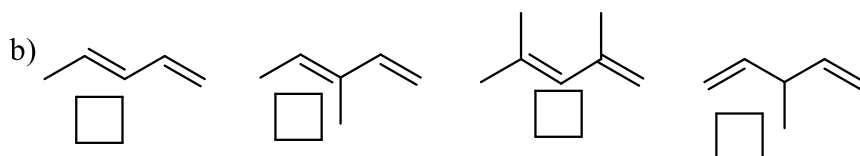
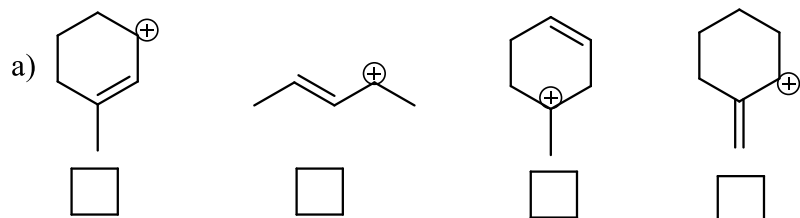
8. Write a complete reactions for the following:

a) **Allylic bromination** of 1 - butene followed by **dehydrobromination**

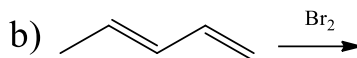
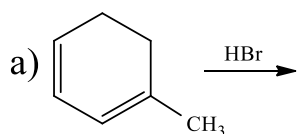
b) Addition of HBr to 1,3-butadiene (**DO ONLY 1,4-addition**)- thermodynamically stable product.

c) Addition of Br₂ to 1,3 - cyclohexadiene (**DO ONLY 1,2-addition**)- kinetically stable product.

9. Identify the stability trend (**1 = highest , 4 = lowest**)



10. Write a complete **mechanism** for the following reactions. Please show all electron flows and intermediates.



ANSWERS

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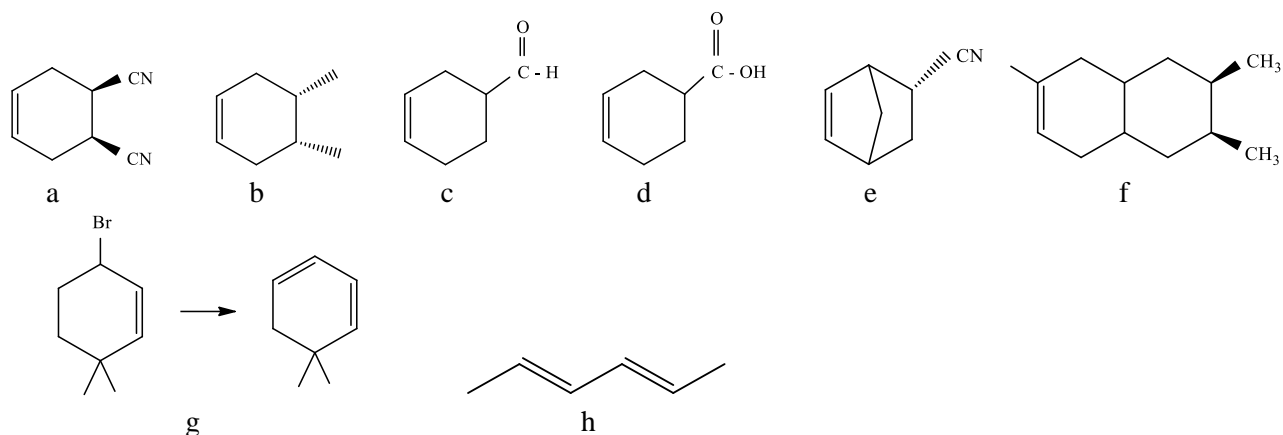
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1. Part A (B)

Part B (B)

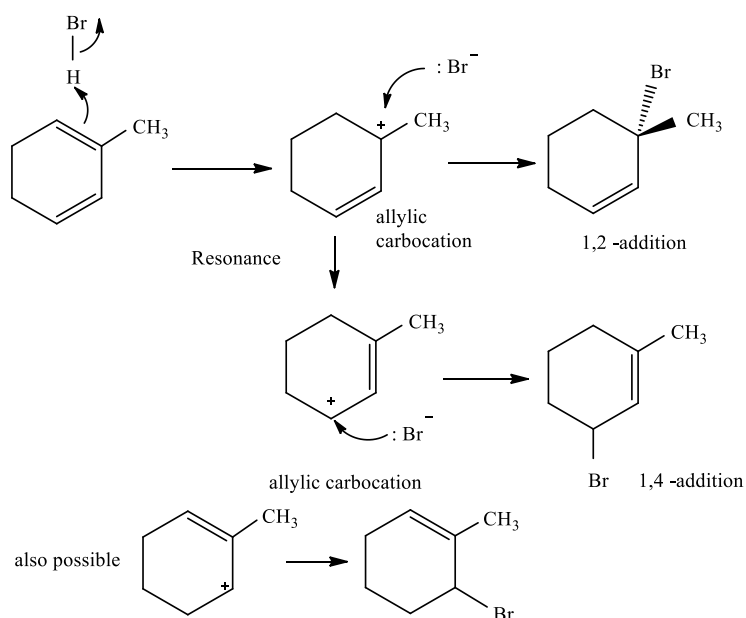
Part C (A)

2.



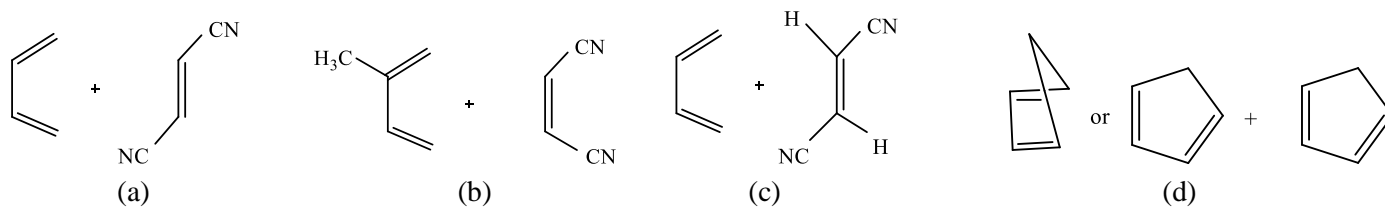
3. C, D, and E

4.

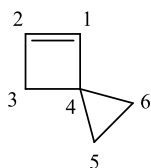


1,2 addition reaction is kinetically controlled and happens at room temperature. It is fast with low activation energy, ΔG^\ddagger , but it is less stable. 1,4-addition product is thermodynamically more stable. It is slower reaction more stable product.

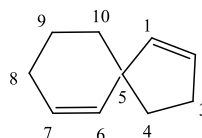
5.



6. a) 1,3 – Cyclopentadiene or Cyclopenta- 1,3- diene
 b) 1,2- Dimethyl- 1,3- cyclopentadiene or 1,2- Dimethylcyclopenta – 1,3 – diene
 c) 2,3,6 - Dimethyl-1,3- cyclohexadiene or 2,3- Dimethylhexa- 1,3 -diene
 d) Cis- 2-butene
 e) 7-Methylbicyclo [4.3.0]-nona-1,7-diene or 7-Methylbicyclo [4.3.0]- 1,7 nonadiene
 f) 2-Methyl – 1,4 – hexadiene or 2-Methylhexa-1,4-diene
 g) 3- Methenyl -1- cyclobutene or 3- Methenyl -1- cyclobuta- 1- ene (may use methylene)
 h) 1,3 – cyclopentadiene or Cyclopenta -1,3- diene
 i) 1-Ethenyl- 1,4-cyclohexadiene or 1-Ethenylcyclohexa-1,4-diene (may use vinyl)
 j) Spiro[2,3]-1-hexene or Spiro[2.3]hexa-1-ene k) Spiro [4.5]-1,6-decadiene or Spiro [4.5]deca-1,6-diene

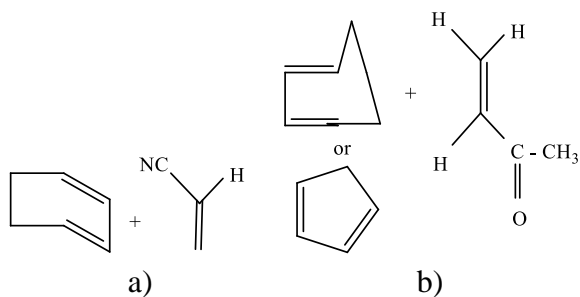


i)



k)

7.

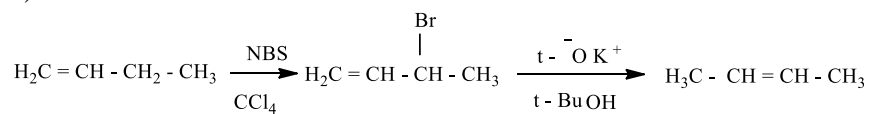


a)

b)

8.

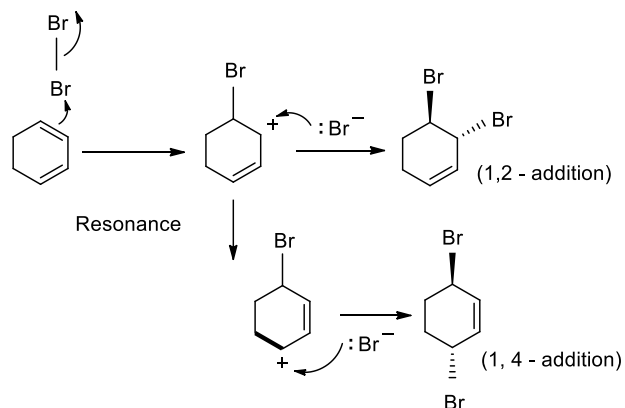
a)



b)



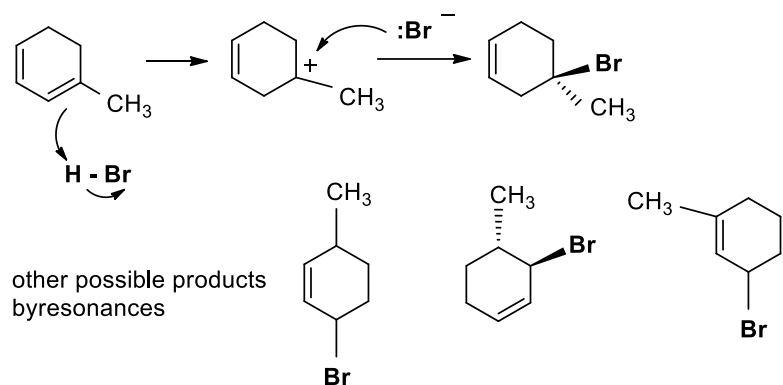
c)



9. a) 1, 2, 4, 3 b) 3, 2, 1, 4

10.

a)



b)

