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IUPAC Nomenclature of Bicyclic System

Special class

Shashank Tewari • Sept 17, 2023

INTRODUCTION
TO
GENERAL ORGANIC CHEMISTRY

2 Bicyclo

1 Spiro

IUPAC Nomenclature of Bicyclic System

2 ring system

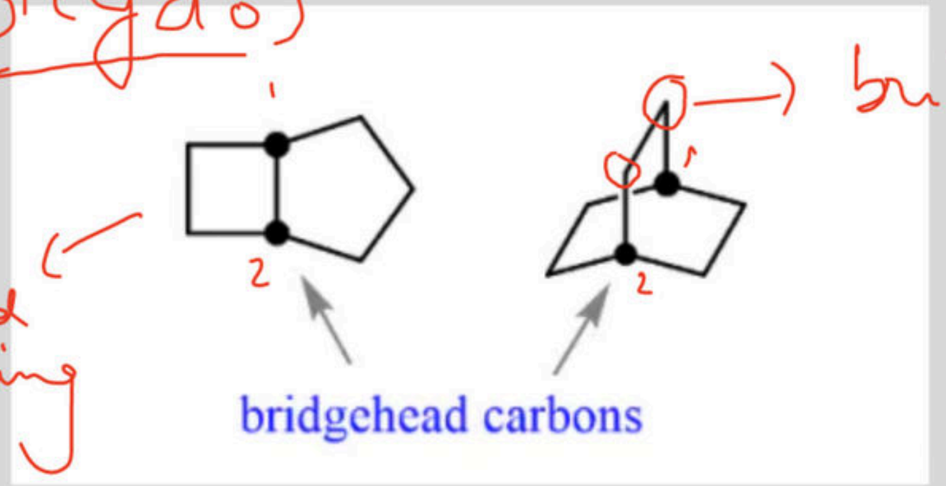
Bicyclic Compounds Nomenclature

(GPAT 2014)

1. The total number of atoms in all rings together gives the root name of the compound and sometimes. It is followed by a suffix denoting the functional group with the highest priority.

2. The carbon chain numbering always begins at one bridgehead atom (i.e., where the rings meet), and then it continues along the carbon chain along the longest path, to the next bridgehead atom. Numbering is then continued along the second longest path and so on.

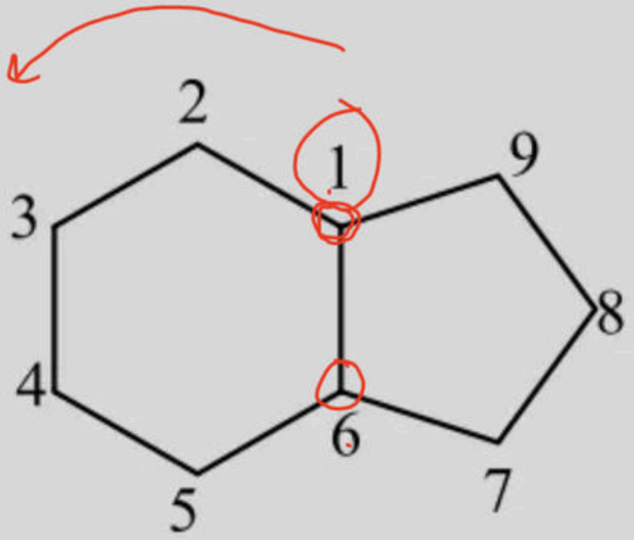
(Bicyclo)



bridge atom

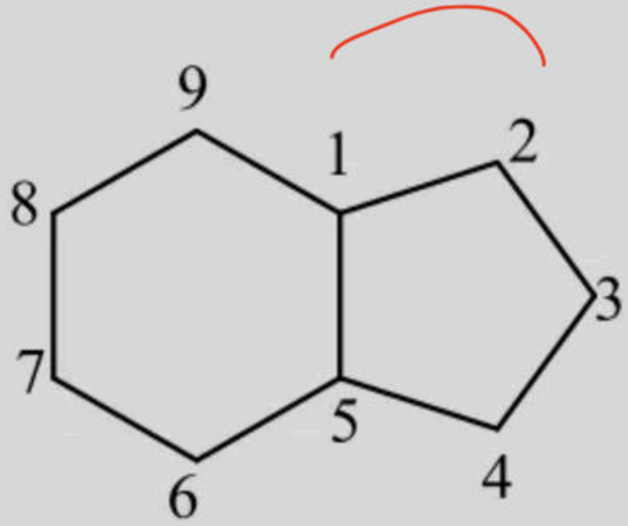
fused ring

Bicyclo



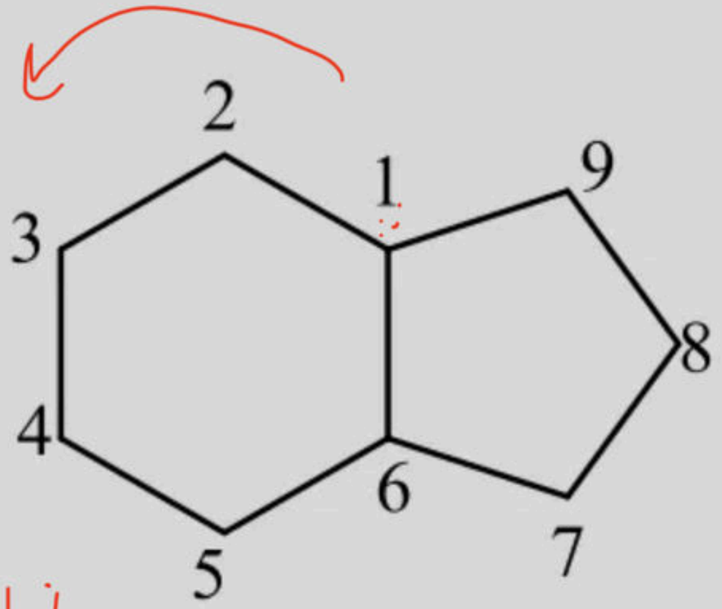
OR

X



start from fused carbon → toward bigger ring.

Correct Numbering



✓ Substituent

✓ Bicyclo

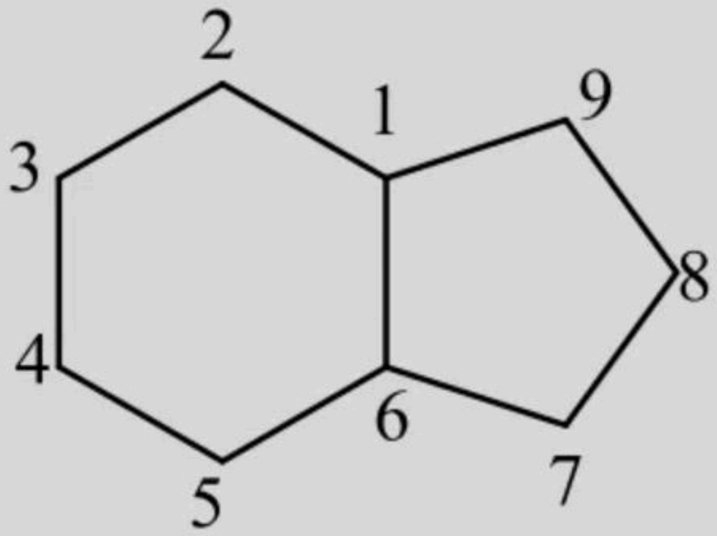
[ ]

Total no. of C

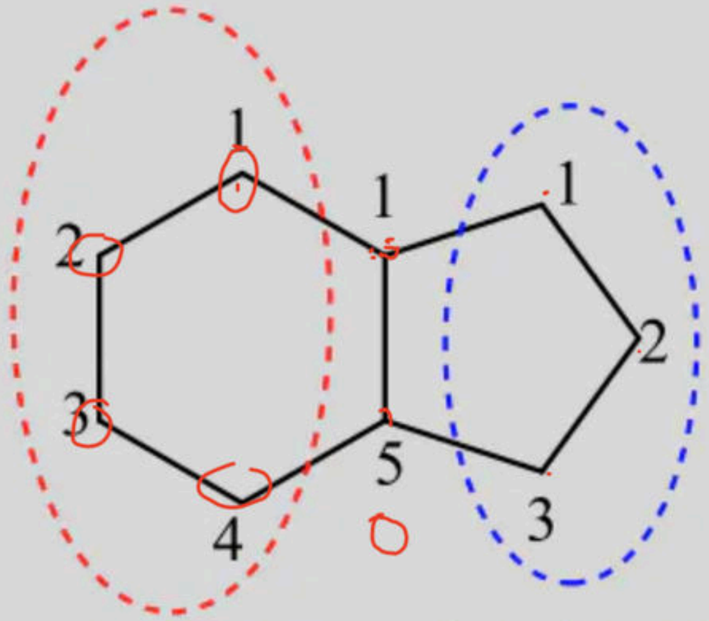
alkane

1

Total no. of carbon atom



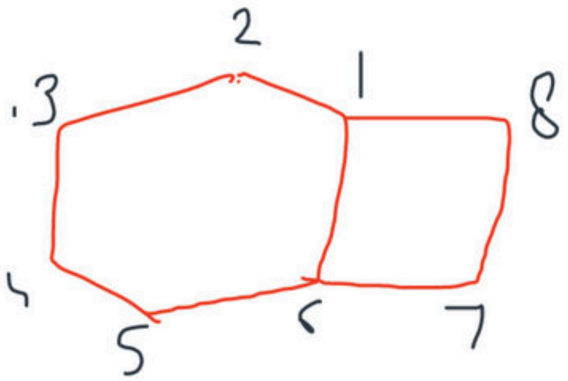
nonane



4 carbon ring

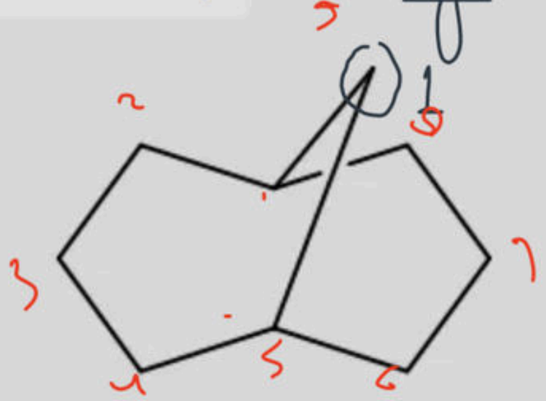
3 carbon ring

Bicyclo[4.3.0]nonane

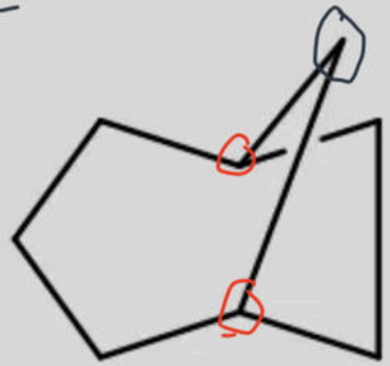


✓ Bicyclo [4.2.0] octane

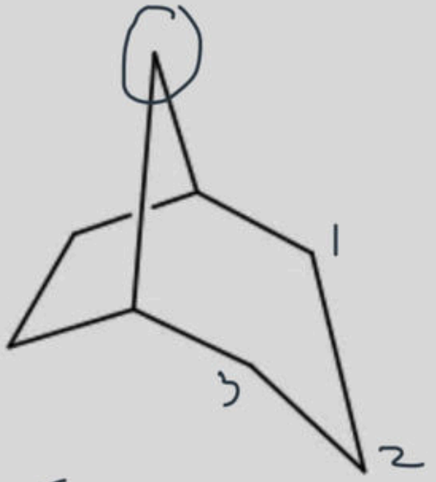
Bridge head atoms



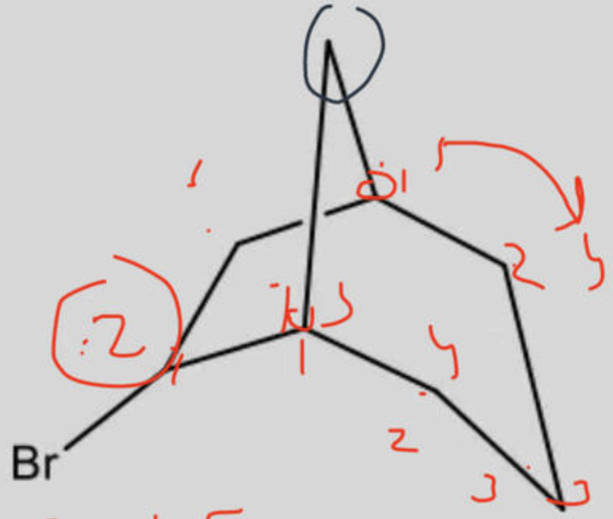
Bicyclo[3.3.1]nonane



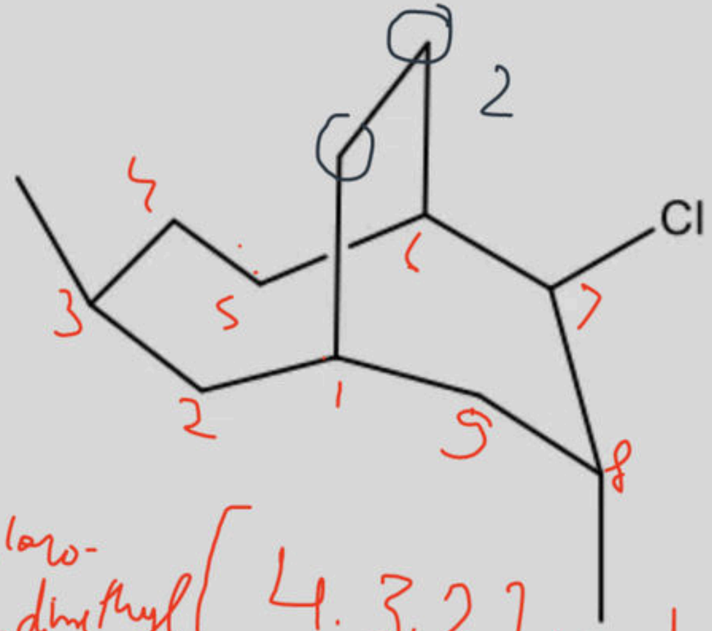
Bicyclo[3.2.1]octane



Bicyclo[3.2.1]octane



6-Bromo Bicyclo[3.2.1]octane



7chloro-3,8-dimethyl[4.3.2]undecane.

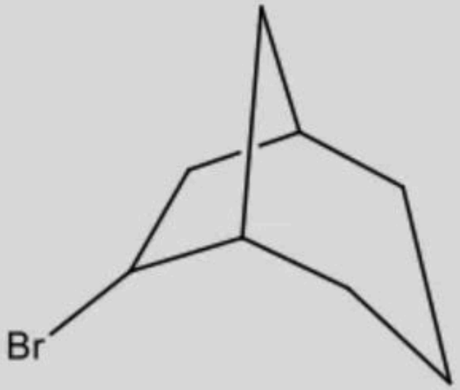
(3+7+8)

(4+8+9)

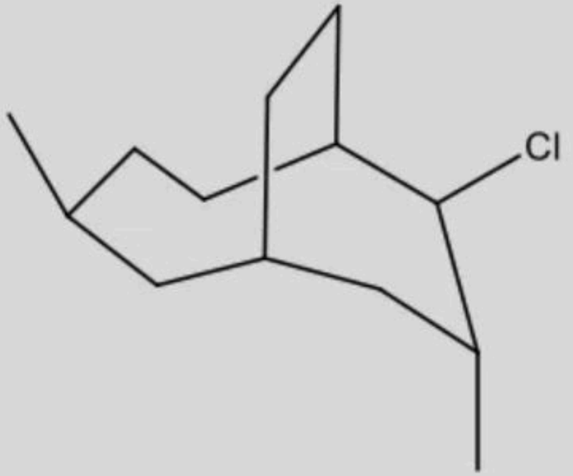
bicyclo[3.3.1]nonane

bicyclo[3.2.1]octane

bicyclo[3.2.1]octane

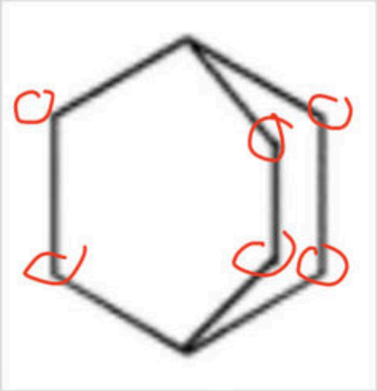


6-Bromobicyclo[3.2.1]octane



7-chloro-3,8-dimethylbicyclo[4.3.2]undecane

What is the IUPAC name of the following compound?

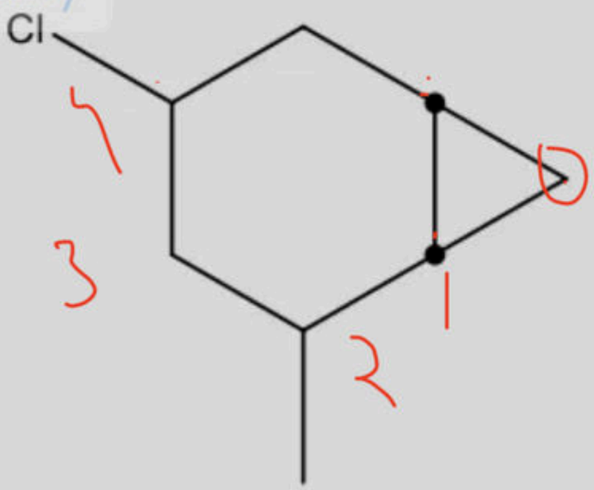


a) Bicyclo(2.2.2) octane

b) Tricyclo(2.2.2) octane

c) Bicyclo(2.2.0) octane

d) Bicyclo (2.2.1) heptane

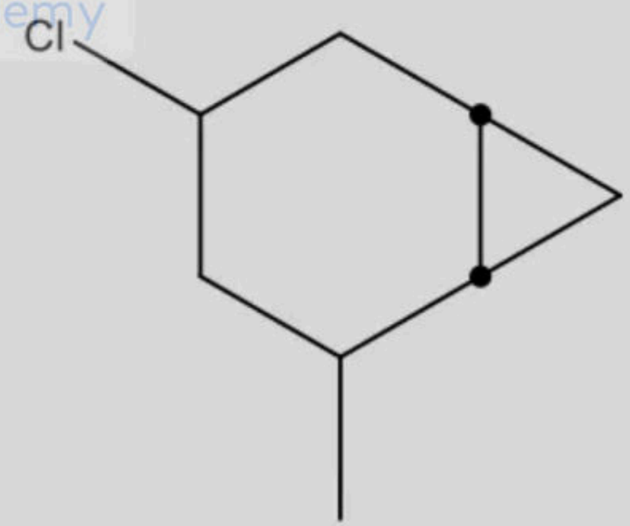


A. 4-chloro-2-methylbicyclo[4.1.0]heptane

B. 3-chloro-5-methylbicyclo[4.1.0]heptane

C. 6-chloro-4-methylbicyclo[4.1.0]heptane

D. 2-methyl-4-chlorobicyclo[4.1.0]heptane

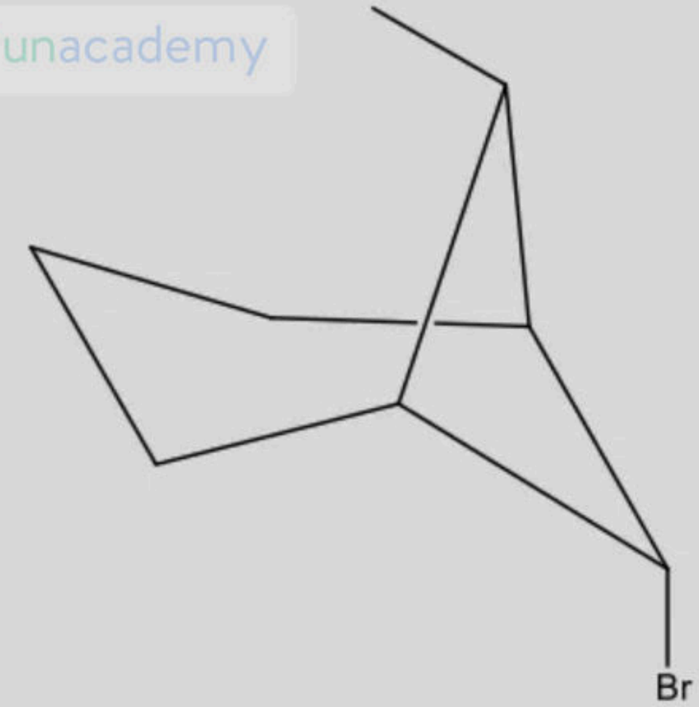


A. 4-chloro-2-methylbicyclo[4.1.0]heptane

B. 3-chloro-5-methylbicyclo[4.1.0]heptane

C. 6-chloro-4-methylbicyclo[4.1.0]heptane

D. 2-methyl-4-chlorobicyclo[4.1.0]heptane

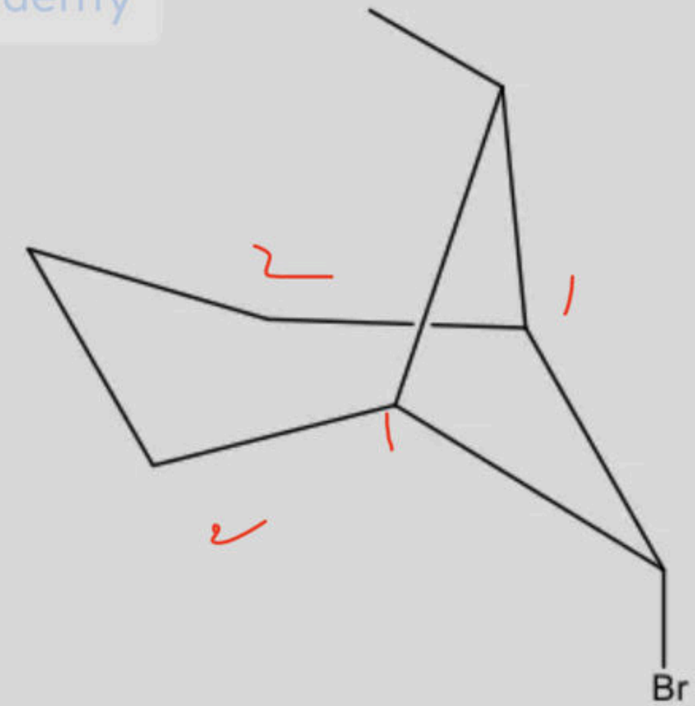


A. 7-bromo-6-methylbicyclo[3.1.1]heptane

B. 6-bromo-7-methylbicyclo[3.1.1]heptane

C. 2-bromo-3-methylbicyclo[3.1.1]heptane

D. 3-bromo-2-methylbicyclo[3.1.1]heptane



A. 7-bromo-6-methylbicyclo[3.1.1]heptane

B. 6-bromo-7-methylbicyclo[3.1.1]heptane

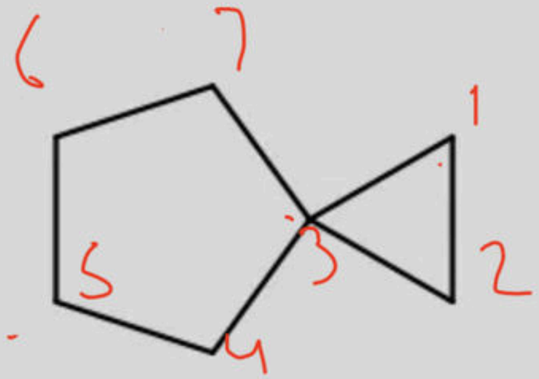
C. 2-bromo-3-methylbicyclo[3.1.1]heptane

D. 3-bromo-2-methylbicyclo[3.1.1]heptane

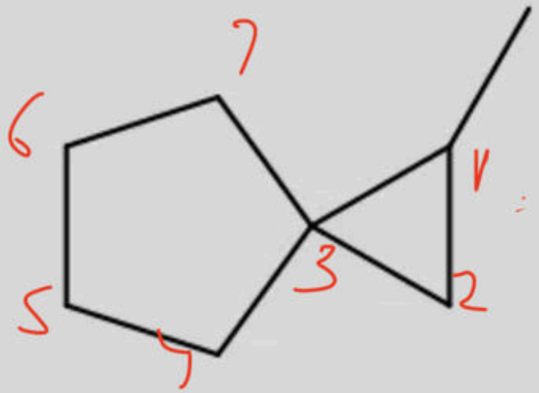
Spirocyclic Compounds

↓

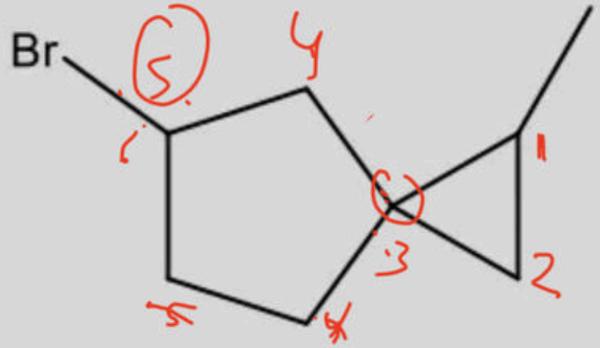
(Reverse the rules)



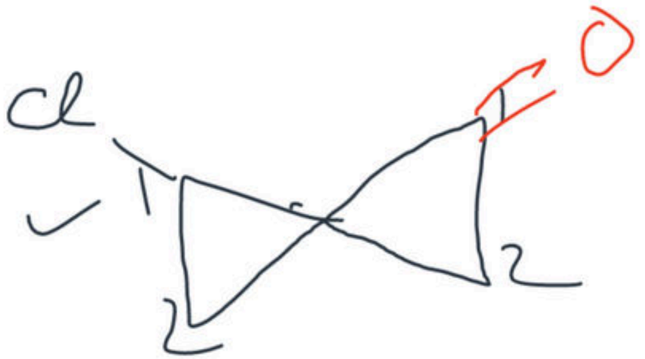
spiro[2.4]heptane

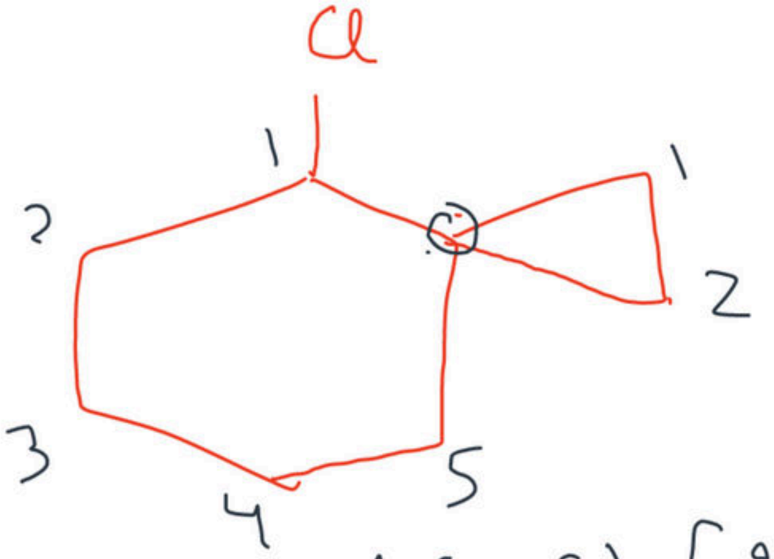


1-methylspiro[2.4]heptane



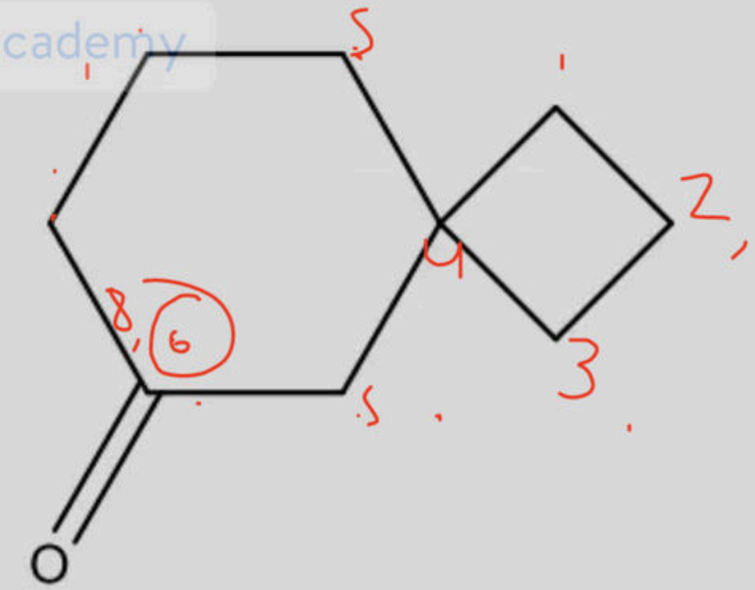
5-bromo-1-methylspiro[2.4]heptane





4-Cl spiro [2.5] octane

4-Chloro spiro [2.2] pentan-1-one

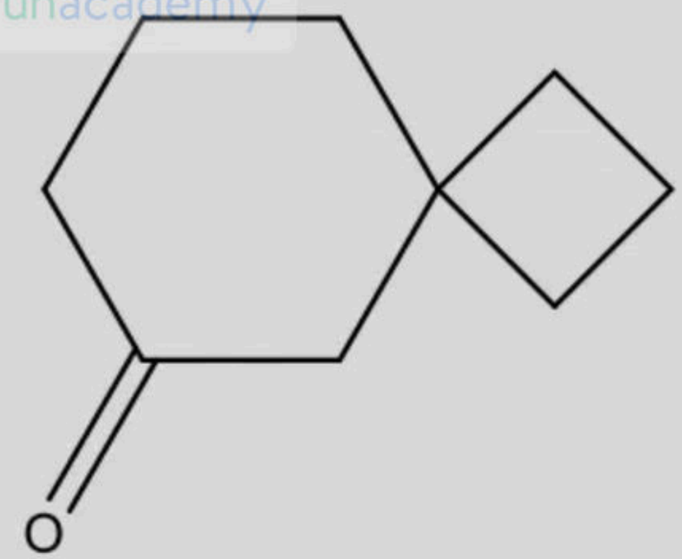


A. spiro[3.5]nonan-6-one

B. spiro[3.5]nonan-3-one

C. spiro[3.5]nonan-4-one

D. spiro[3.5]nonan-7-one

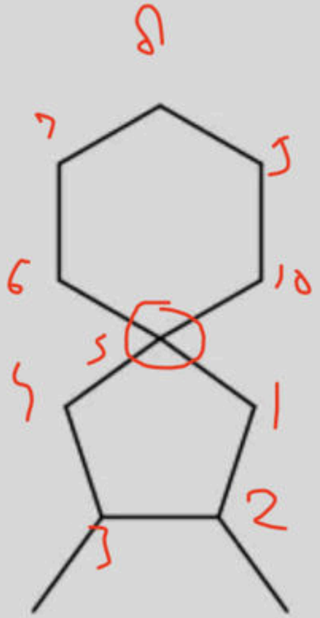


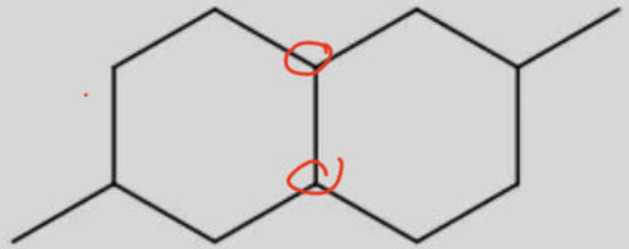
A. spiro[3.5]nonan-6-one

B. spiro[3.5]nonan-3-one

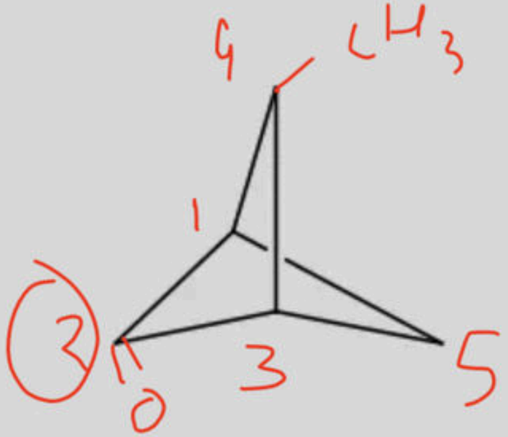
C. spiro[3.5]nonan-4-one

D. spiro[3.5]nonan-7-one





3,8-dimethyl.
Bicyclo[4.4.0] decane



2,3-dimethyl Spiro [4.5] decane

4-methyl Bicyclo [1.1.1] pentan-2-one