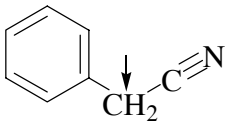
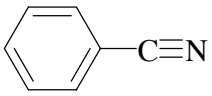
2.1. Since the indicated carbon of phenylacetonitrile is $sp^3$ hybridized, it is reasonable for this compound to show C–H stretching at less than 3000 $cm^{-1}$ (2960-2940 $cm^{-1}$). Where as benzonitrile has only aromatic C–H stretching which is typically between 3100 - 3000 $cm^{-1}$ (page 87).

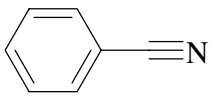


phenylacetonitrile

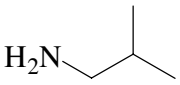


benzonitrile

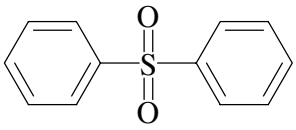
2.2.



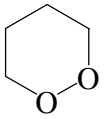
a. benzonitrile



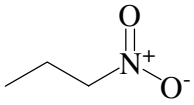
b. isobutylamine



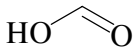
c. diphenyl sulfone



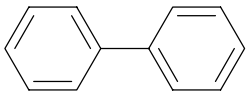
d. dioxane



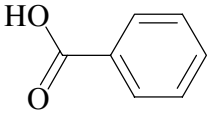
e. 1-nitropropane



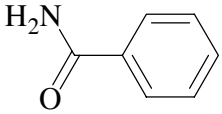
f. formic acid



g. biphenyl

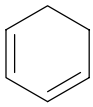


h. benzoic acid



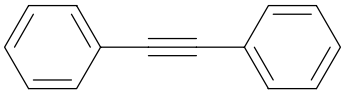
i. benzamide

2.3.



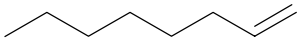
1,3-Cyclohexadiene

Spectrum B



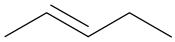
Diphenylacetylene

Spectrum A



1-Octene

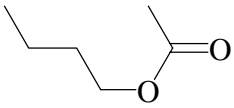
Spectrum D



2-Pentene

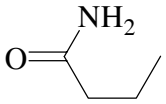
Spectrum C

2.4.



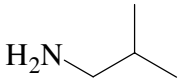
Butyl acetate

Spectrum E



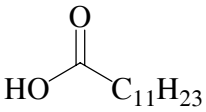
Butyramide

Spectrum H



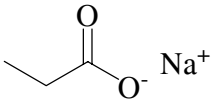
Isobutylamine

Spectrum I



Lauric acid

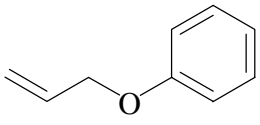
Spectrum F



Sodium propionate

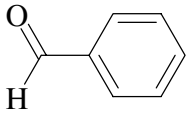
Spectrum G

2.5.



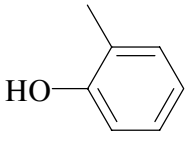
Allyl phenyl ether

Spectrum L



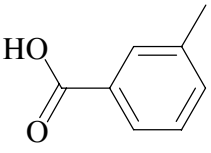
Benzaldehyde

Spectrum M



o-Cresol

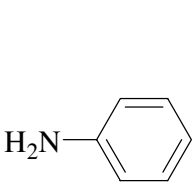
Spectrum K



m-Toluic acid

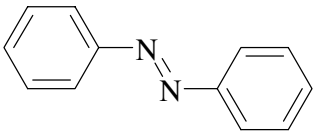
Spectrum J

2.6.



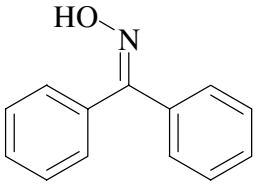
Aniline

Spectrum Q



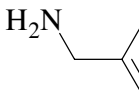
Azobenzene

Spectrum O



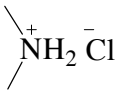
Benzophenone oxime

Spectrum P



Benzylamine

Spectrum N

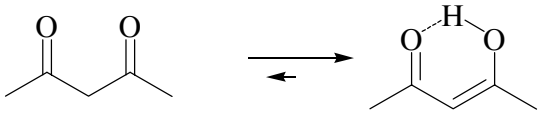


Dimethylamine hydrochloride

Spectrum R

2.7. Methyl isothiocyanate $CH_3–N=C=S$

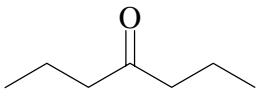
2.8. This diketone exists primarily (~ 90%) in enol form (in $CCl_4$)



enol

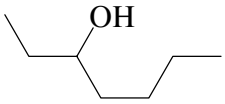
Enols such as this display broad, shallow O–H stretching bands (here from 3400-2500 $cm^{-1}$). The strong band at ~1600 $cm^{-1}$ is the enolic coupled C=C–OH band. (See pages 80, 94, and 98)

2.9.



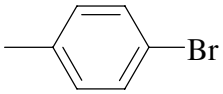

4-Heptanone

**A**



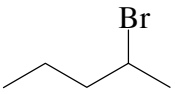

3-Heptanol

**B**



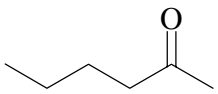

4-Bromotoluene

**C**



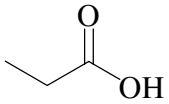

2-Bromopentane

**D**



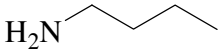

2-Hexanone

**E**



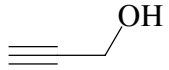

Propionic Acid

**F**



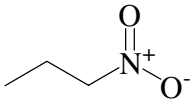

Butylamine

**G**



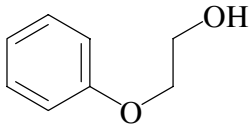

Propargyl alcohol

**H**



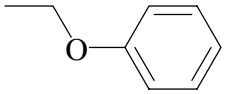

1-Nitropropane

**I**



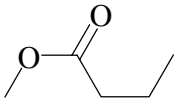

2-Phenoxylethanol

**J**



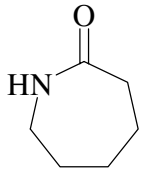

Phenetole

**K**



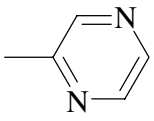

Methyl Butyrate

**L**



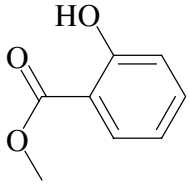

Caprolactam

**M**



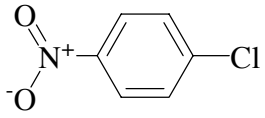

2-methylpyrazine

**N**



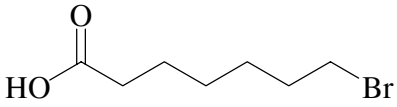

Methyl salicylate

**O**



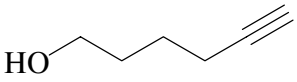

1-Chloro-4-Nitrobenzene

**P**



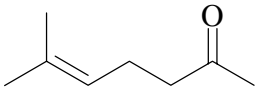

7-Bromo Heptanoic Acid

**Q**



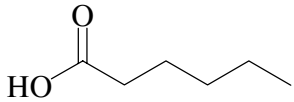

5-Hexyn-1-ol

**R**



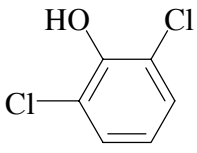

6-Methyl-5-hepten-2-one

**S**



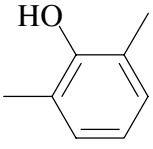

Hexanoic acid

**T**



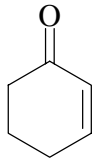

2,6-Dichlorophenol

**U**




2,6-Dimethylphenol

**V**




2-Cyclohexen-1-one

**W**