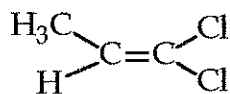
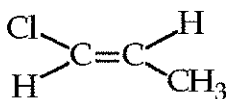


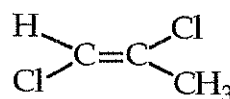
(20) 1. Consider the compounds shown below:



(I)



(II)



(III)

- a) Which one of the above compounds would exhibit a different number of pmr signals than the other two? \_\_\_\_\_
- b) Which one of the above compounds would have the most upfield pmr signal? \_\_\_\_\_
- c) Which one of the above compounds would have the most downfield pmr signal? \_\_\_\_\_
- d) Which one of the above compounds would have the same number of pmr and cmr signals? \_\_\_\_\_
- e) Which one of the above compounds would have the most downfield cmr signal? \_\_\_\_\_
- (12) 2. Draw the structures of three constitutional isomers of formula  $\text{C}_2\text{H}_2\text{Br}_2\text{Cl}_2$  whose pmr spectra consist of only a singlet signal.

\_\_\_\_\_

(15) 3. Draw structural formulas for three of the four compounds shown below based on the pmr spectral data provided.

a)	$C_5H_{10}Br_2$	singlet	$\delta$ 1.2 ppm	6H	_____
		triplet	$\delta$ 2.0 ppm	2H	
		triplet	$\delta$ 3.2 ppm	2H	

b)	$C_7H_{14}O_2$	singlet	$\delta$ 1.1 ppm	9H	_____
		singlet	$\delta$ 2.1 ppm	3H	
		singlet	$\delta$ 4.2 ppm	2H	

c)	$C_5H_9BrO_2$	triplet	$\delta$ 1.2 ppm	3H	_____
		triplet	$\delta$ 2.9 ppm	2H	
		triplet	$\delta$ 3.5 ppm	2H	
		quartet	$\delta$ 4.0 ppm	2H	

d)	$C_5H_{10}O_3$	triplet	$\delta$ 1.3 ppm	6H	_____
		quartet	$\delta$ 4.1 ppm	4H	

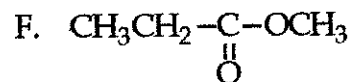
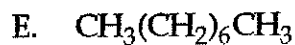
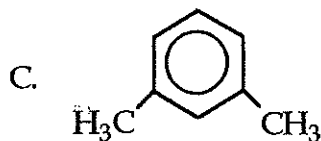
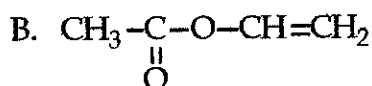
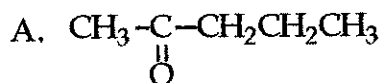
- (12) 4. For the four sets of proton-decoupled cmr spectra that follow, select a structure from those shown below that corresponds to the appropriate spectral data set.

Cmr data set #1:  $\delta$  22.7 ppm  
 $\delta$  25.0 ppm  
 $\delta$  41.8 ppm  
 $\delta$  60.5 ppm

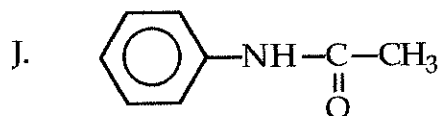
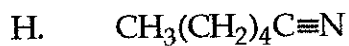
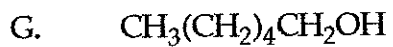
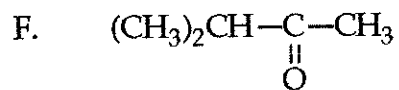
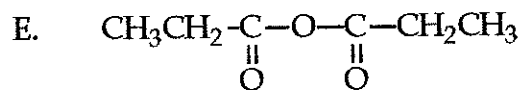
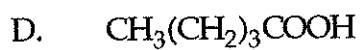
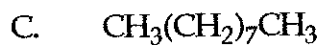
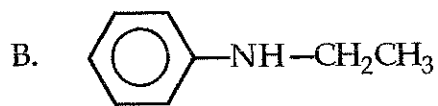
Cmr data set #2:  $\delta$  14.1 ppm  
 $\delta$  22.9 ppm  
 $\delta$  28.4 ppm  
 $\delta$  32.7 ppm  
 $\delta$  62.4 ppm

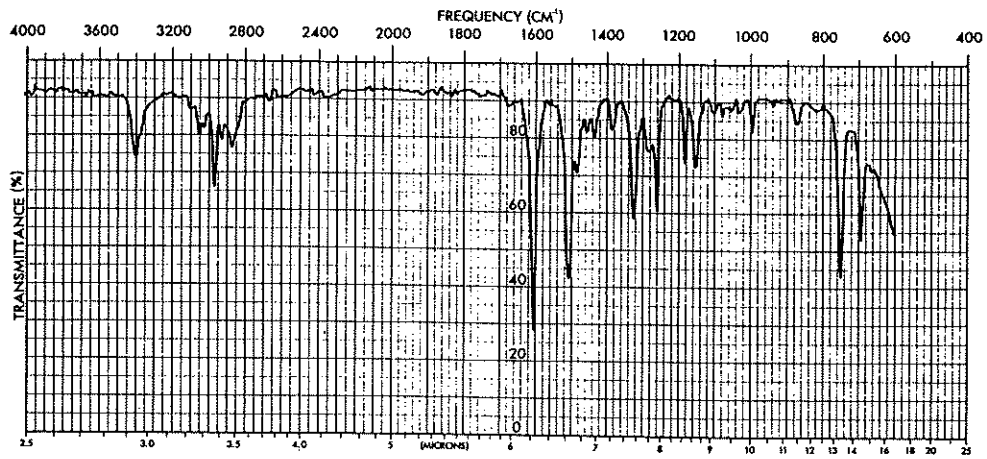
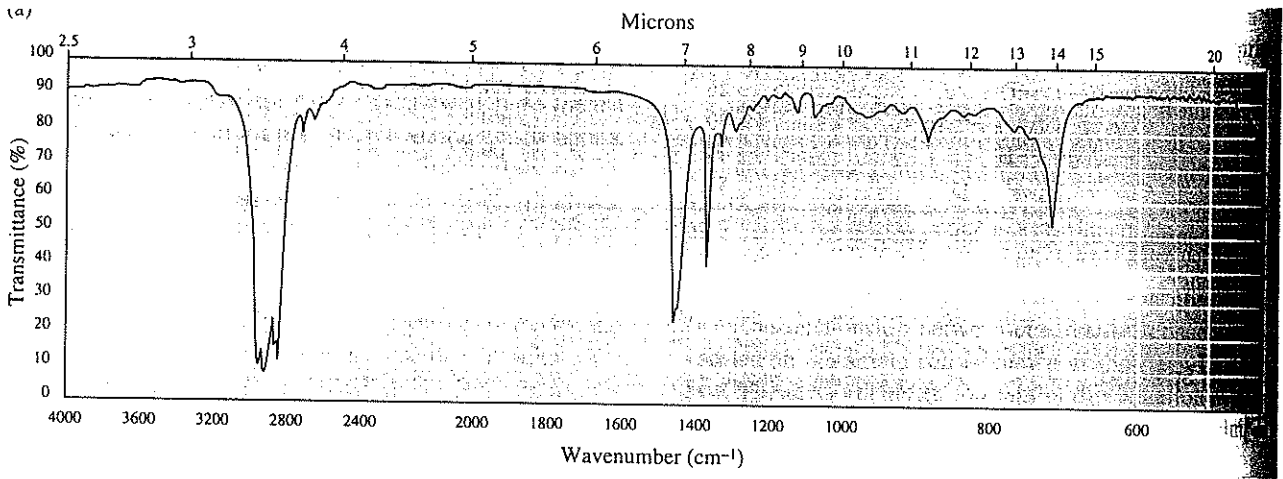
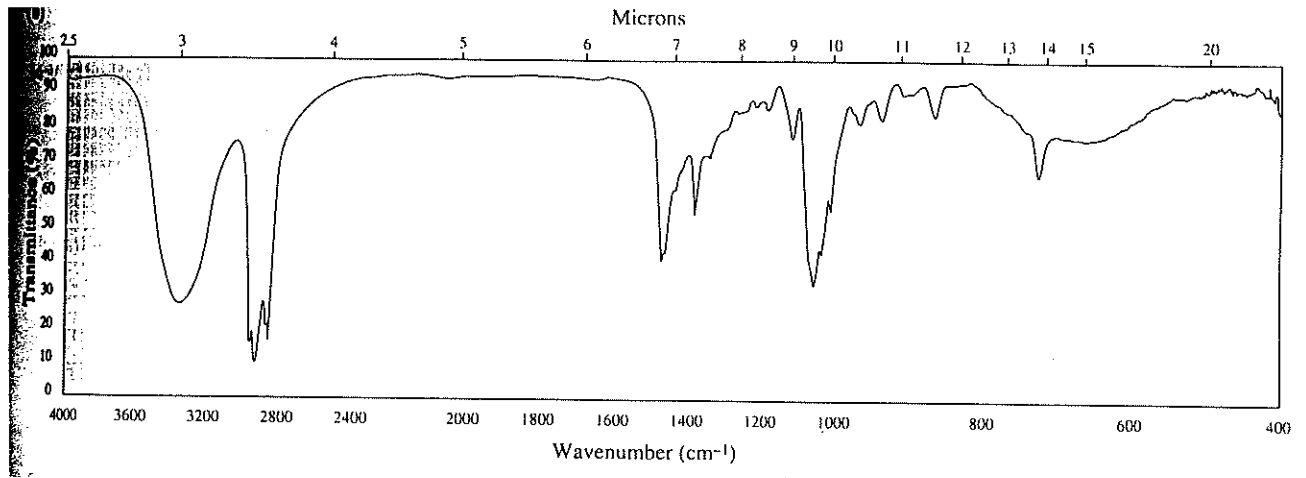
Cmr data set #3:  $\delta$  20.4 ppm  
 $\delta$  98.2 ppm  
 $\delta$  141.7 ppm  
 $\delta$  167.7 ppm

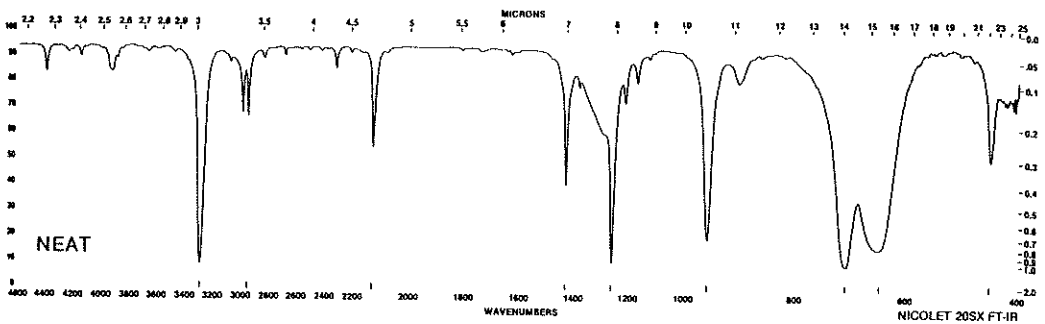
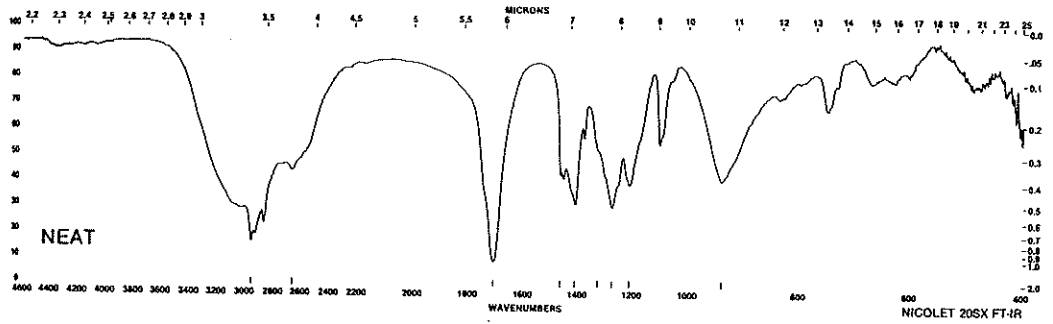
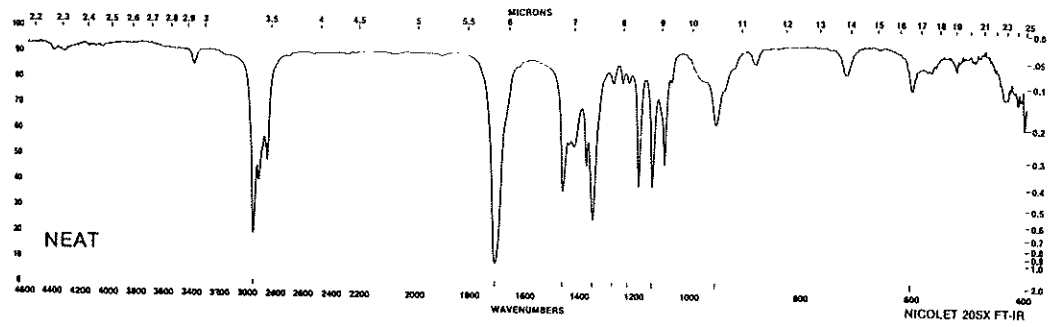
Cmr data set #4:  $\delta$  10.3 ppm  
 $\delta$  27.6 ppm  
 $\delta$  51.4 ppm  
 $\delta$  174.6 ppm



(24) 5. For the six infrared spectra that follow, specify which spectra correspond to which of the compounds below:







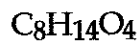
- (5) 6. An unknown compound of formula  $C_6H_{10}$  reacts with excess  $H_2$  in the presence of platinum to give  $C_6H_{12}$ . The proton-coupled cmr spectrum of the unknown consists of the following signals:

triplet	@	$\delta$ 22.9 ppm
triplet	@	$\delta$ 25.3 ppm
doublet	@	$\delta$ 127.2 ppm

Based on the data provided, deduce the structure of the unknown compound.

- 
- (12) 7. Based on the spectral data provided below, deduce the structures of (A) and (B):

(A)



Sig. IR:  $1735\text{ cm}^{-1}$

Pmr: 6H (t)  $\delta$  1.20 ppm  
4H (s)  $\delta$  2.61 ppm  
4H (q)  $\delta$  4.15 ppm

(B)

Molar mass = 83 g/mol

Sig. IR:  $2250\text{ cm}^{-1}$

Pmr: 6H (d)  $\delta$  1.07 ppm  
1H (m)  $\delta$  2.03 ppm  
2H (d)  $\delta$  2.26 ppm

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(A)

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(B)