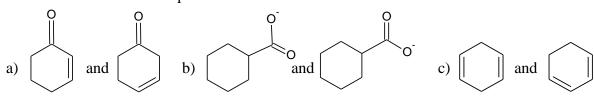
1) Determine whether the following pairs of structures are different compounds or resonance structures of the same compound.



- O. O
- and ${}^{-}CH_2 C H$ d) $CH_2 = C - H$
- e) $CH_2 = CH {}^+CH_2$ and ${}^+CH_2 CH = CH_2$
- Η O - H0 f) H - C - C - H and H - C = C - H g) $H - {}^{+}C - H$ and H - C - HΗ Η
 - $H O^+$
- O O 1 + h) $H-C-NH_2$ and $H-C=NH_2$
- i) $CH_2 = C = O$ and $H C \equiv C OH$
- O Oj) $CH_3 - C - CH = CH_2$ and $CH_3 - C = CH - CH_2$
- 2) In the following sets of resonance structures, label the major and minor contributors and state which structures would be of equal energy. Add any missing resonance forms.
 - $CH_3 CH C \equiv N$: $CH_3 - CH = C = N:$
 - O O b) $[CH_3 - C = CH - {}^+CH - CH_3]$ $CH_3 - {}^+C - CH = CH - CH_3$
 - O O O 0 c) $[CH_3 - C - CH - C - CH_3]$ $CH_3 - C = CH - C - CH_3$
 - NH_2 NH_2 d) $[CH_3 - CH_2 - {}^+C - NH_2]$ $CH_3 - CH_2 - C = {}^{+}NH_2$

3) Draw the important resonance forms to show the delocalization of charges in the following ions.

O
$$\parallel$$
 a) $CH_3 - C - \overline{} CH_2$

O
$$\parallel$$
 b) $H - C - CH = CH - CH_2$

i)
$$CH_2 = CH - CH = CH - {}^+CH - CH_3$$

j)
$$CH_3 - CH = CH - CH = CH - CH_2 - {}^+CH_2$$

4) For each pair of ions determine which is more stable. Use resonance to explain your answer.

a)
$$CH_3 - {}^+CH - CH_3$$
 $CH_3 - {}^+CH - OCH_3$

b)
$$CH_2 = CH - {}^+CH - CH_3$$
 ${}^+CH_2 - CH = CH - CH_3$

c)
$${}^{\mathsf{T}}CH_2 - CH_3$$
 ${}^{\mathsf{T}}CH_2 - C \equiv N$:

$$\mathsf{d}) \qquad \qquad \mathsf{CH}_2^{\mathsf{+}}$$

e)
$$CH_3 - N - CH_3$$
 $CH_3 - CH - CH_3$ $|$ $|$ $CH_3 - ^+C - CH_3$ $CH_3 - ^+C - CH_3$