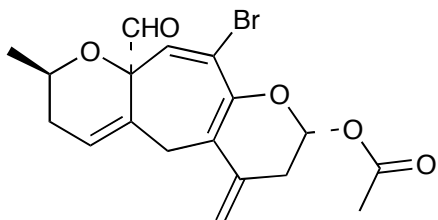
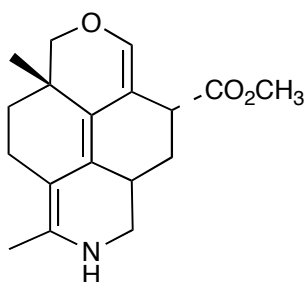


**Problem 1.****Calculate the UV  $\lambda$** 

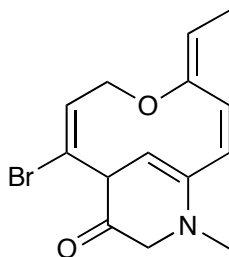
A.



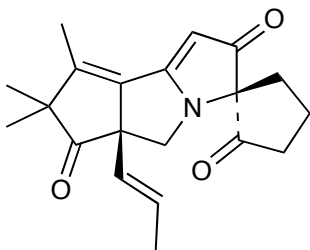
B.



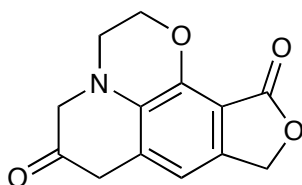
D



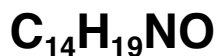
C



E.



## Problem 2.



<sup>13</sup>C-NMR

157.5 (s) \_\_\_\_\_

122.5 (d) \_\_\_\_\_

110.2 (d) (2) \_\_\_\_\_

138.9 (s) (2) \_\_\_\_\_

119.2 (s) (Hint: not a C=C !) \_\_\_\_\_

68.4 (t) \_\_\_\_\_

28.7 (t) \_\_\_\_\_

26.1 (t) \_\_\_\_\_

25.4 (d) \_\_\_\_\_

24.9 (q) (2) \_\_\_\_\_

17.6 (q) \_\_\_\_\_

<sup>1</sup>H NMR

6.42 (t, J = 1.4 Hz, 1H) \_\_\_\_\_

6.38 (d, J = 1.4 Hz, 2 H) \_\_\_\_\_

3.94 (t, J = 7.4 Hz, 2H) \_\_\_\_\_

2.66 (m, 1H) \_\_\_\_\_

2.35 (s, 6H) \_\_\_\_\_

1.71 (quint, J = 7.4, 2H) \_\_\_\_\_

1.62 (dt, J = 8.4, 7.4 Hz, 2H) \_\_\_\_\_

1.41 (d, J = 8.2 Hz, 3H) \_\_\_\_\_

IR:

3030, 2970, 2925, 2254, 835, 711

MS: 217, 202, 119, 54

**Problem 3.**

$C_{13}H_{22}O$  \_\_\_\_\_

**$^{13}C$ -NMR (ppm)**

207.7, s \_\_\_\_\_

146.3 s \_\_\_\_\_

141.8 s \_\_\_\_\_

127.7, d \_\_\_\_\_

111.2, t \_\_\_\_\_

44.8, t \_\_\_\_\_

39.8, t \_\_\_\_\_

30.9, q \_\_\_\_\_

29.6, t \_\_\_\_\_

27.3, t \_\_\_\_\_

23.4, t \_\_\_\_\_

23.2, q \_\_\_\_\_

17.8, q \_\_\_\_\_

**$^1H$ -NMR (ppm)**

5.75 (s, 1H) \_\_\_\_\_

4.88 (d, J = 0.5 Hz, 1H) \_\_\_\_\_

4.80 (d, J = 0.5 Hz, 1H) \_\_\_\_\_

2.45 (t, J = 6.8 Hz, 2H) \_\_\_\_\_

1.96 (t, J = 7.8 Hz, 2H) \_\_\_\_\_

2.09 (s, 3H) \_\_\_\_\_

1.73 (s, 3H) \_\_\_\_\_

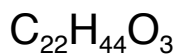
1.70 (s, 3H) \_\_\_\_\_

1.51-1.60 (m, 2H) \_\_\_\_\_

1.19-1.41 (m, 4H) \_\_\_\_\_

**IR( $cm^{-1}$ ):** 3038, 3008, 2963, 2927, 1716, 1598, 990, 891

**UV:**  $\lambda_{max} = 229$  nm

**Problem 4.** **$^{13}\text{C-NMR}$** 

173.1, s

71.9, d

61.3, t

38.0, t

37.9, t

33.9, t

31.9, t

31.2, t

30.0, t

29.9, t

29.8, t

29.7, t

29.6, t

29.4, t

29.1, t

25.1 t

22.8, t

23.5, t

23.4, t

19.0, t

14.1, q

13.8, q

 **$^1\text{H-NMR}$** 

4.08 (q, J = 6.8 Hz, 2H)

3.21 (m, 1H)

2.25 (t, J = 8.1 Hz, 2H)

2.20 (br s, 1H) exchanges

1.20-1.71 (m, 32H)

0.97 (t, J = 6.8 Hz, 3H)

0.90 (t, J = 7.7 Hz, 3H)

**MS**: 356, 338, 311, 243, 143, 88, 73**IR**( $\text{cm}^{-1}$ ): 3480(strong, broad), 2970, 2936, 2877, 1734**UV**: < 200 nm

### Problem 5.

$C_{12}H_{22}O$  \_\_\_\_\_

#### $^{13}C$ -NMR

214.8, s \_\_\_\_\_

49.7, d \_\_\_\_\_

42.1, t \_\_\_\_\_

31.8, t \_\_\_\_\_

36.9, t \_\_\_\_\_

29.3, t \_\_\_\_\_

29.0, t \_\_\_\_\_

24.2, t \_\_\_\_\_

23.2, q x2 \_\_\_\_\_

28.2, d \_\_\_\_\_

26.3 t \_\_\_\_\_

#### $^1H$ -NMR

2.26-2.20 (m, 3H) \_\_\_\_\_

1.75-1.90 (m, 1H) \_\_\_\_\_

1.22-1.70 (m, 6H) \_\_\_\_\_

1.18-1.36 (m, 6H) \_\_\_\_\_

1.01 (d, J = 8.1 Hz, 6H) \_\_\_\_\_

IR ( $cm^{-1}$ ): 2962, 2939, 2876, 1705, 1131

UV: < 200 nm

MS (m/z): 182, 167, 112