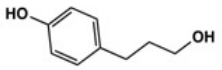
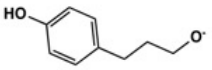
Score for this quiz: **100** out of 100
Submitted Feb 26 at 2:48pm
This attempt took 47 minutes.

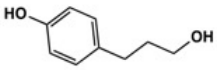
Question 1

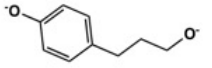
6 / 6 pts

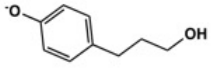
The compound below has pKas of 10 and 16. What is its structure at pH 12?



A)


C)


B)


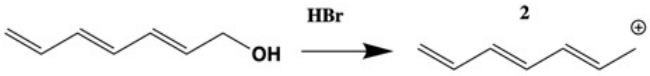
D)


- B
- C
- A
- D

Correct!

Question 2

6 / 6 pts



The hexatriene cation (2) is made via the method shown above.
Which statement most accurately describes the hexatriene-cation (2).

(A) It is a pi conjugated system that contains 8 pi electrons.
(B) It is a pi conjugated system that contains 4 pi electrons.
(C) It is a pi conjugated system that contains 6 pi electrons and is aromatic.
(D) It is a pi conjugated system that contains 6 pi electrons.

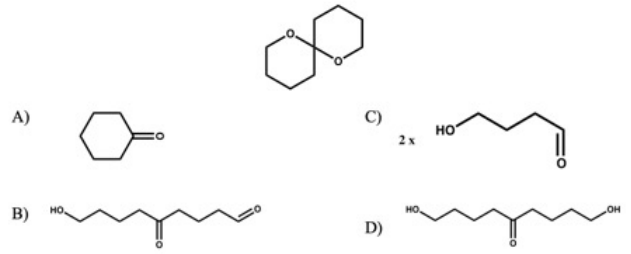
- B
- C
- A
- D

Correct!

Question 3

6 / 6 pts

The ketal listed below is made from one of the ketones listed below. Identify which ketone it was made from



- B
- C

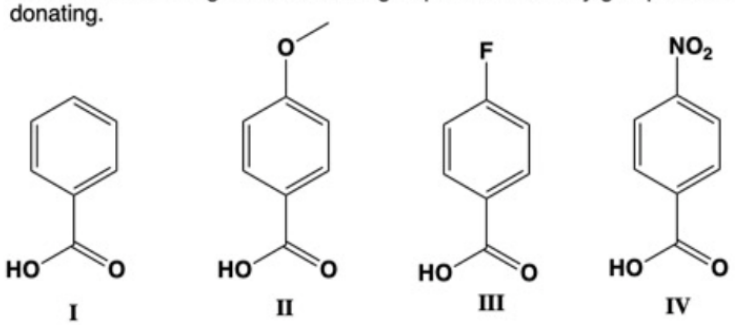
Correct!

- D
- A

Question 4

7 / 7 pts

Rank the following compounds from low pKa to high pKa. A nitro group is more electron withdrawing than a fluorine group and a methoxy group is electron donating.



Lowest pKa

[Select]

[Select]

[Select]

[Select]

Highest pKa

Answer 1:

Correct!

IV

Answer 2:

Correct! III

Answer 3:

Correct! I

Answer 4:

Correct! II

Question 5

6 / 6 pts

Assume the pKa of acetic acid is 4.8. What is the ratio of CH_3COOH to CH_3COO^- at pH 6.8.

(A) 100
(B) 0.01
(C) 1
(D) 0.0001

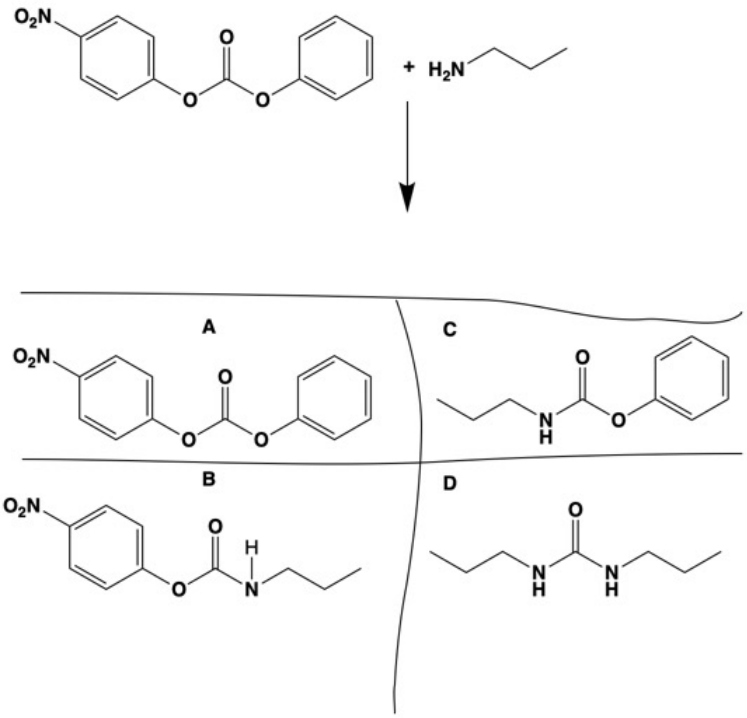
- D
- A
- C

Correct! B

Question 6

7 / 7 pts

What is the major product of the reaction shown, below assuming 1 molar equivalent of the amine was added.



- B

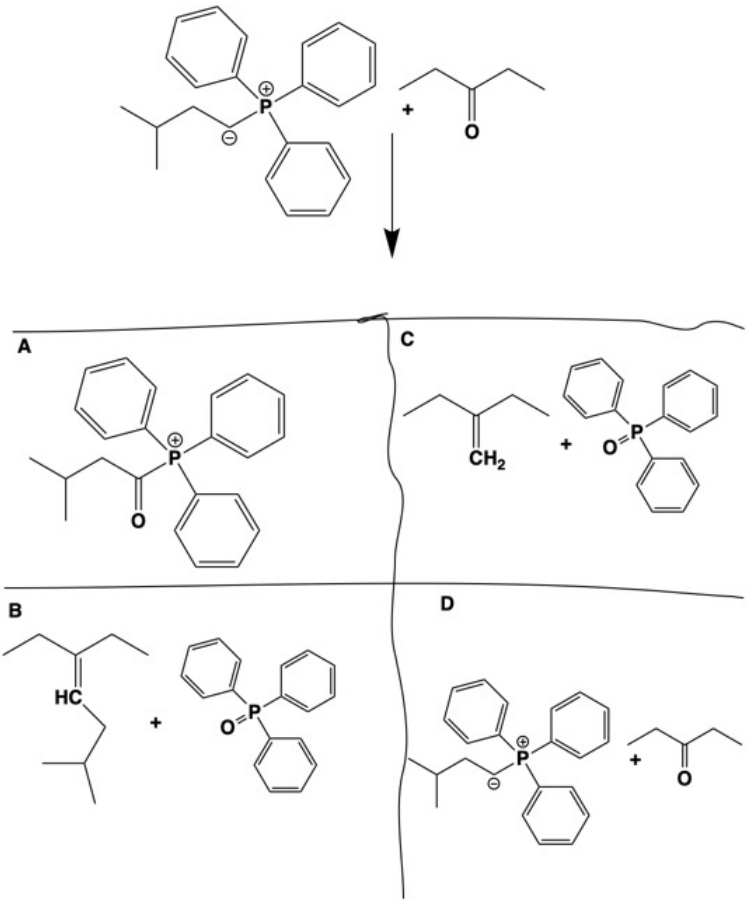
Correct!

- C
- D
- A

Question 7

7 / 7 pts

Predict the product of this reaction.



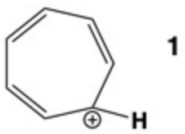
Correct!

- (•) B
- ( ) C
- ( ) D
- ( ) A

Question 8

7 / 7 pts

Compound 1 is shown below, it is a planar molecule and a cation, which statement most accurately describes it.



1

Compound 1 [Select] .

Compound 1 [Select] .

Compound 1 has [Select] π electrons.

Answer 1:

Correct!

has a conjugated pi system

Answer 2:

Correct!

is aromatic

Answer 3:

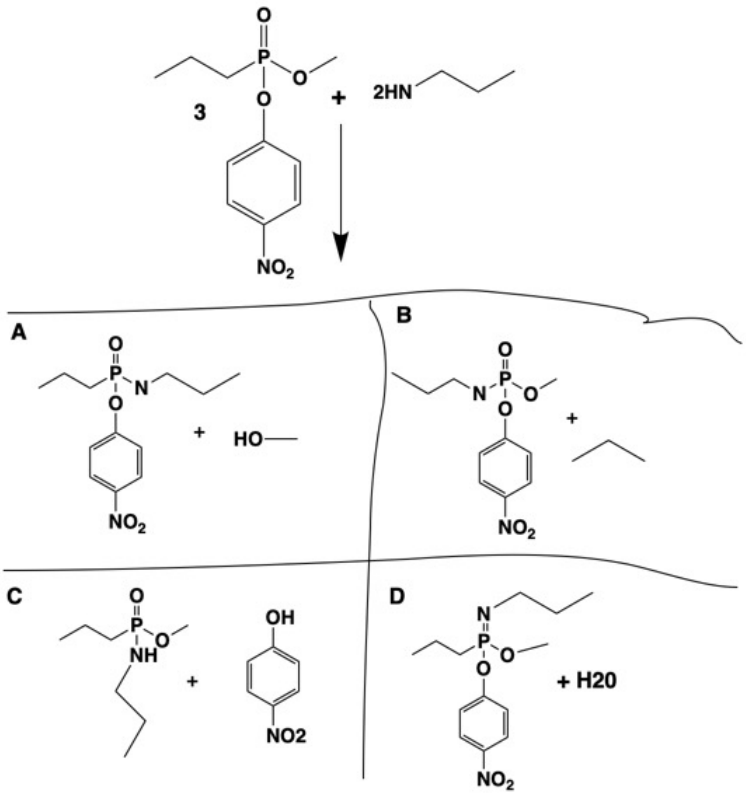
Correct!

6

Question 9

7 / 7 pts

The phosphorous compound 3 contains a carbonyl, which is very electrophilic. Phosphorous carbonyls behave in a similar manner to carbon based carbonyls, and generate a pentavalent intermediate after nucleophilic addition. In addition, the group with the lowest pKa leaves. Based on this information, predict the product of this reaction.



- A
- B

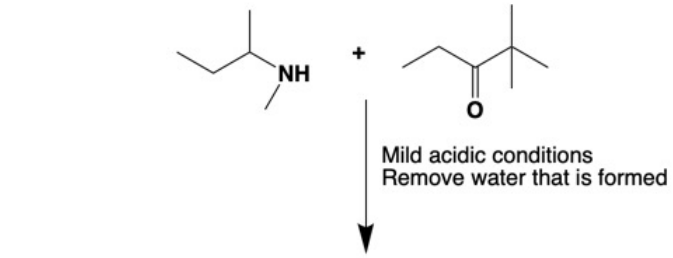
Correct!

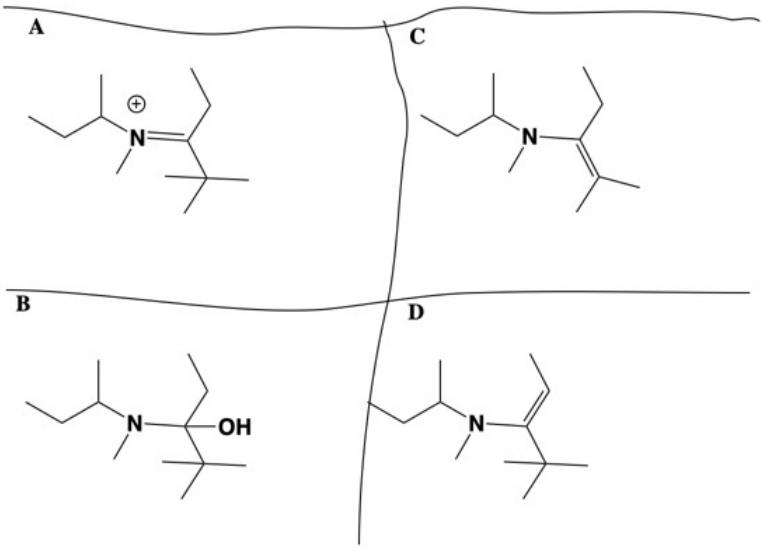
- C
- D

Question 10

7 / 7 pts

Predict the major product of this reaction



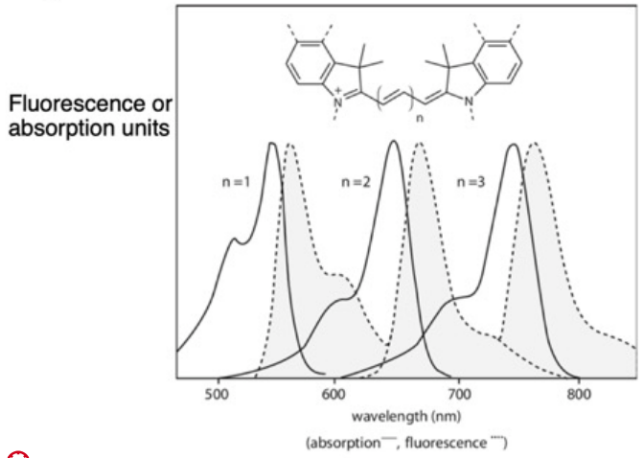


- B
- C
- D (Correct!)
- A

Question 11

6 / 6 pts

The chemical structure of three cyanine dyes along with their absorption and emission spectra are shown below. The absorption and emission spectra of the cyanine dyes increases with the n number. Complete the following statements.



The dye corresponding to n = 3 has a [Select] level of pi conjugation than the dyes that have n = 1 or n = 2. This is important because the energy spacing between molecular orbitals [Select] with *increasing pi conjugation*.

Answer 1:

Correct!

higher

Answer 2:

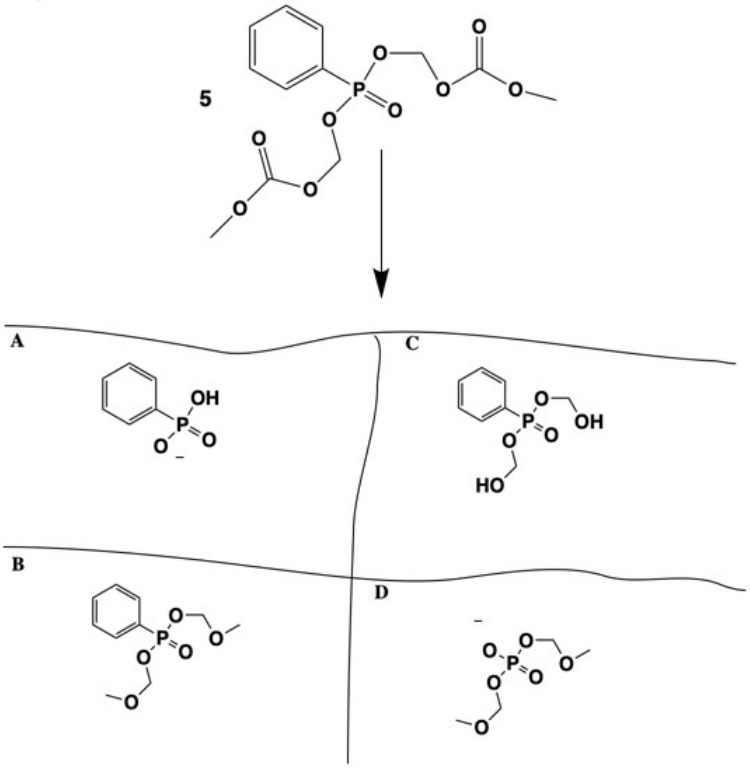
Correct!

decreases

Question 12

7 / 7 pts

The structure of compound 5 is shown below. Compound 5 is added to cells, it is membrane permeable but gets hydrolyzed by esterases, which catalyze the water hydrolysis of its carbonate. Listed below are four potential structures that will be generated after esterase hydrolysis of compound 5. Choose the final structure of this molecule after hydrolysis by esterases.



Correct!

- (A) A
- (C) C
- (D) D
- (B) B

Question 13

7 / 7 pts

Folate dye conjugates are being used for ovarian cancer imaging. Which of the following statements most accurately describes why folate dyes conjugates are effective as cancer diagnostics.

(A) The folate receptor is under-expressed in ovarian cancer cells and this allows healthy tissue to be identified

(B) The folate receptor is over-expressed in ovarian cancer cells and folate dye conjugates can thereby image these tumor cells allowing for their surgical removal.

(C) Folate dye conjugates are internalized by tumor cells and this allows the regrowth of the tumor to be measured.

(D) None of the above statements are true

- (D) D

A

Correct!

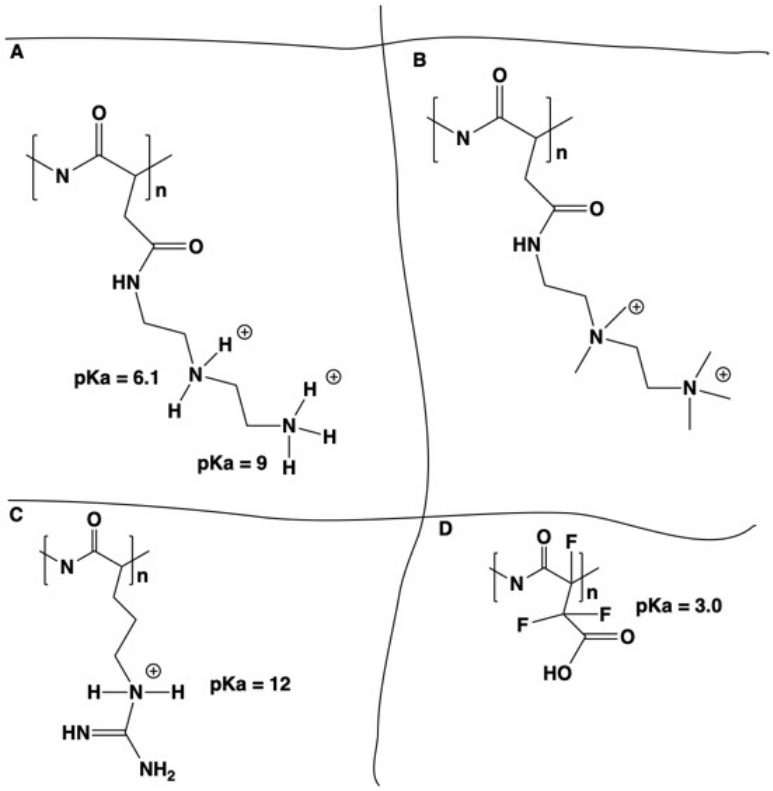
B

C

Question 14

7 / 7 pts

Which of the following polymers will be most effective at disrupting endosomes via the colloid osmotic mechanism. The approximate pKa of the polymers is listed below.



D

C

Correct!

A

B

Question 15

7 / 7 pts

Solid lipid nanoparticles used for RNA delivery contain an ionizable lipid. The ionizable lipid disrupts endosomes by which of the following mechanisms

(A) The ionizable lipid disrupts endosomes by inhibiting proteases in the endosome.

(B) The ionizable lipid hydrolyzes in the acidic pH of the endosome and this causes endosomal disruption.

(C) The ionizable lipid has a pKa around 6 and is therefore protonated in endosomes, this causes its to ion pair with negatively charged lipids in the endosomes. The ion pairing of the ionizable lipid with the negatively charged lipid in the endosome causes endosomal disruption because it lowers their effective polar head group size.

(D) none of the above

- D
- A

Correct!

- C
- B

Quiz Score: **100** out of 100