QUESTION 1

What are the best reagents/conditions to perform the following simple synthesis?

A
1. NBS/hν
2. K⁺ −O−t-Bu
3. Br₂
4. Excess NaNH₂
5. H₂O
6. HgSO₄/H₂SO₄/H₂O

B

C
1. NBS/hν
2. Na⁺ −OMe
3. Br₂
4. Excess NaNH₂
5. H₂O
6. HgSO₄/H₂SO₄/H₂O

D
1. Br₂/hν
2. Na⁺ −OMe
3. Br₂
4. Excess NaNH₂
5. H₂O
6. HgSO₄/H₂SO₄/H₂O
QUESTION 2
MC28s

Give the product of the following reaction

1. \[ \text{Ph} \equiv :^\ominus \xrightarrow{\text{Na}^\ominus} \]

2. \[ \text{H}_3\text{O}^+ \]

A \[ \text{Ph} \equiv \text{HO} \]

C \[ \text{Ph} \equiv \text{OH} \]

B \[ \text{Ph} \equiv \text{OH} \]

D \[ \text{Ph} \equiv \text{OH} \]

the acetylide anion attacks LEAST substituted end for steric reasons, there is no ELECTRONIC reason to atatck the most substituted end as there would be if the oxygen were protonated, although in that case it still wouldn't actually attack the most substituted end, the acetylide would simply remove the proton from the oxygen!
QUESTION 3

MC28y

Give the product of the following reaction

1. Na<sup>+</sup> → ???

2. H<sub>3</sub>O<sup>+</sup> → ???

A

B

C

D

Na<sup>+</sup> → ??? → Na<sup>+</sup> → ???

H<sub>3</sub>O<sup>+</sup> → ???

=
QUESTION 4

Which will be the product of the following reaction sequence?

3-methylpent-1-ene →

1. Br₂/CCl₄
2. Excess NaNH₂
3. H₂O
4. HgSO₄/H₂SO₄/H₂O

A

B

C

D

OH

OH

OH

O
QUESTION 5

Which represents the best synthesis of Y from X?

A  B  C  D
2. HCC≡C⁻ → Na⁺  2. Na⁺ − OMe  2. t-BuO⁻ → K⁺  2. t-BuO⁻ → K⁺
3. NBS/hv  3. HBr/ROOR  3. HBr/ROOR  3. NBS/hv
4. HCC≡C⁻ → Na⁺  4. HCC≡C⁻ → Na⁺  4. HCC≡C⁻ → Na⁺  4. HCC≡C⁻ → Na⁺

A: Br₂/hv → Br₂ Br₂  → 2° Br₂ + HCC≡C⁻ → Na⁺ → cyclohexene + butadiene + Br₂. 2° halide E2+SN2, this is not the best synthesis.

B: Br₂/hv → Br₂ Br₂  → 2° Br₂ + Na⁺ − OMe → cyclohexene + butadiene + Br₂. 2° halide E2+SN2 twice, this is not the best synthesis.

C: Br₂/hv → Br₂ Br₂  → 2° Br₂ + HBr/ROOR → cyclohexene + butadiene + Br₂. 2° halide E2+SN2, this is not the best synthesis.

D: Br₂/hv → Br₂ Br₂  → 2° Br₂ + NBS/hv → cyclohexene + butadiene + Br₂. 2° halide E2+SN2, this is not the best synthesis.
QUESTION 6
MC28o

Which of the following reactions will make the bond indicated by the dashed line?

A
\[ \text{reaction} \]

B
\[ \text{incorrect structure} \]

C
\[ \text{incorrect structure} \]

D
\[ \text{incorrect reaction!!} \]
QUESTION 7
Which is the correct IUPAC name for the following structure?

A. (2R)-bromo-(3R)-methyloct-(5Z)-en-7-yne
B. (7S)-bromo-(6S)-methyloct-(3Z)-en-1-yne
C. (2S)-bromo-(3S)-methyloct-(5E)-en-7-yne
D. (7R)-bromo-(6R)-methyloct-(3Z)-en-1-yne

longest chain that CONTAINS the functional groups, number to give the alkene lowest number

Z-alkene (or in this case, cis- would also be unambiguous)
QUESTION 8
MC28i
Which best describes the products of the following reaction sequence? Stereochemistry is ignored in this problem.

1. 1 Equiv. HCl
2. 1 Equiv. HI
3. \( \text{H}_2/\text{Pd/C} \)
4. 1 Equiv. \( \text{K}^+ - \text{O-t-Bu} \)
5. \( \text{HBr/ROOR} \)

A

B

C

D

1 Equiv. HCl

alkene more reactive than alkyne

1 Equiv. HI

Markovnikov addition

1 Equiv. \( \text{K}^+ - \text{O-t-Bu} \)

1. \( t \)-butoxide gives the most substituted alkene here (physical) with the secondary halide, it would have given the least substituted (Hoffmann) alkene if the halide had been tertiary
2. iodide is a better leaving group than chloride
3. both cis- and trans-alkenes must be formed

luckily stereoisomers have been ignored throughout this problem, we will have a horrible mixture of diastereomers and enantiomers by now