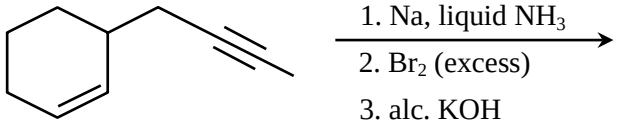
ORGANIC CHEMISTRY

HYDROCARBON

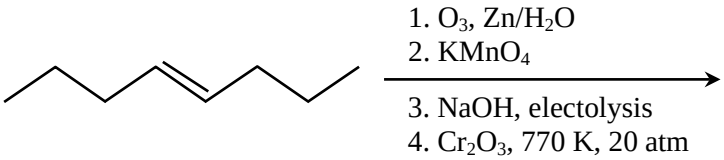
1. The reaction of 4-methyloct-ene (**P**, 2.52 g) with HBr in the presence of $(C_6H_5CO)_2O_2$ gives two isomeric bromides in a 9 : 1 ratio, with combined yield of 50%. Of these, the entire amount of the primary alkyl bromide was reacted with an appropriate amount of diethylamine followed by treatment with eq. K_2CO_3 to given a non-ionic product **S** in 100% yield. The mass (in mg) of **S** obtained is _____.

[Use molar mass (in g mol^{-1}) : H = 1, C = 12, N = 14, Br = 80] **[JEE(Advanced) 2023]**

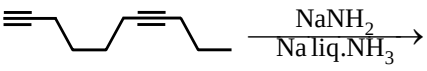
2. The number of isomeric tetraenes (**NOT** containing *sp*-hybridized carbon atoms) that can be formed from the following reaction sequence is _____. **[JEE(Advanced) 2022]**



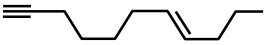
3. The number of -CH_2- (methylene) groups in the product formed from the following reaction sequence is _____. **[JEE(Advanced) 2022]**

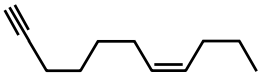


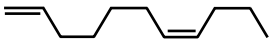
4. The major product formed in the following reaction is **[JEE(Advanced) 2021]**



(A) 

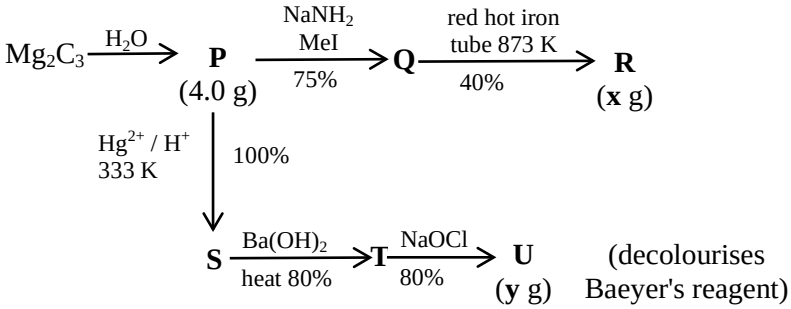
(B) 

(C) 

(D) 

Question Stem for Q.5 and Q.6

For the following reaction scheme, percentage yields are given along the arrow :



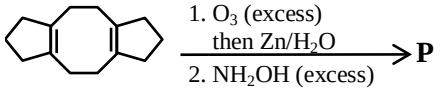
x g and **y** g are mass of **R** and **U**, respectively.

(Use : Molar mass (in g mol^{-1}) of H, C and O as 1, 12 and 16, respectively)

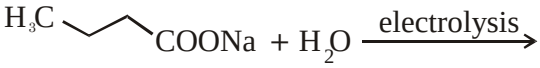
5. The value of **x** is_____. **[JEE(Advanced) 2021]**

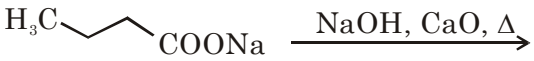
6. The value of **y** is_____. **[JEE(Advanced) 2021]**

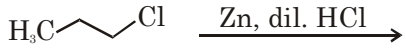
7. In the reaction given below, the total number of atoms having sp^2 hybridization in the major product **P** is _____. **[JEE(Advanced) 2021]**



8. Which of the following reactions produce(s) propane as a major product? **[JEE(Advanced) 2019]**

(A) 

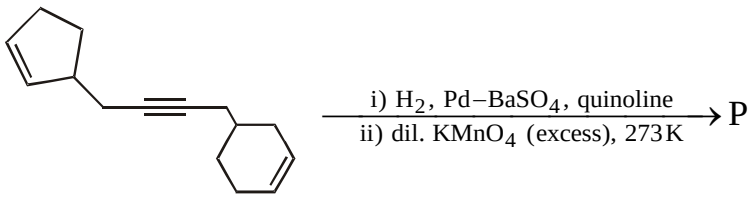
(B) 

(C) 

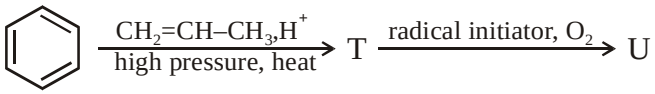
(D) 

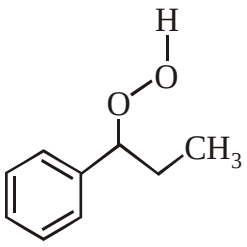
9. Total number of hydroxyl groups present in a molecule of the major product P is _____.

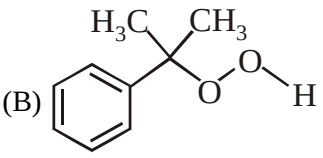
[JEE(Advanced) 2019]

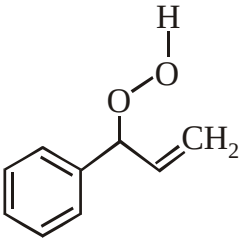


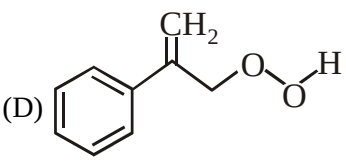
10. The major product U in the following reactions is : **[JEE(Advanced) 2015]**



(A) 

(B) 

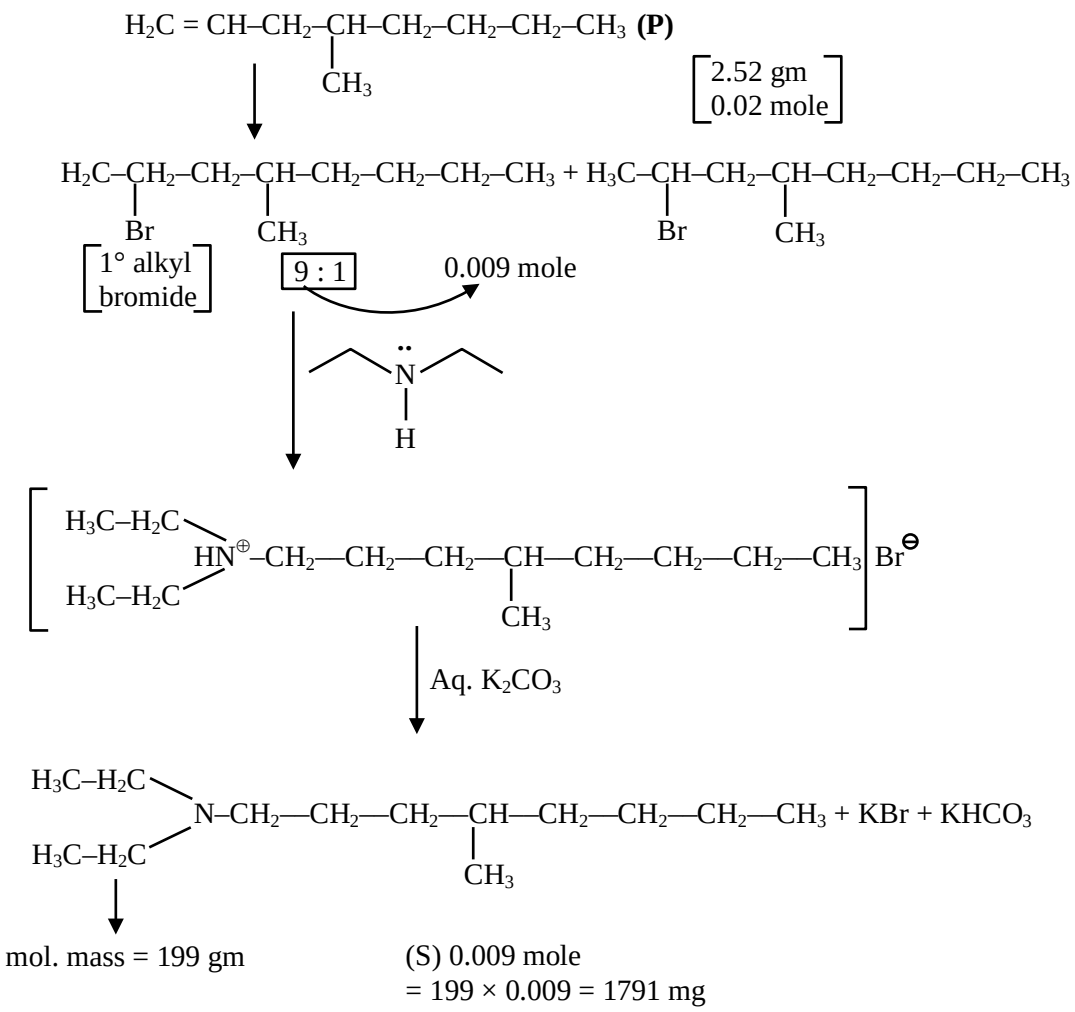
(C) 

(D) 

SOLUTIONS

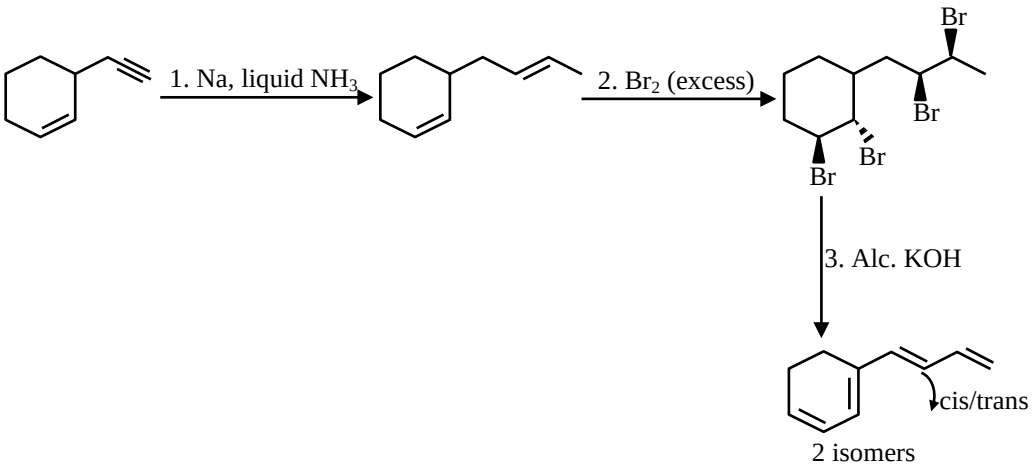
1. Ans. (1791)

Sol.



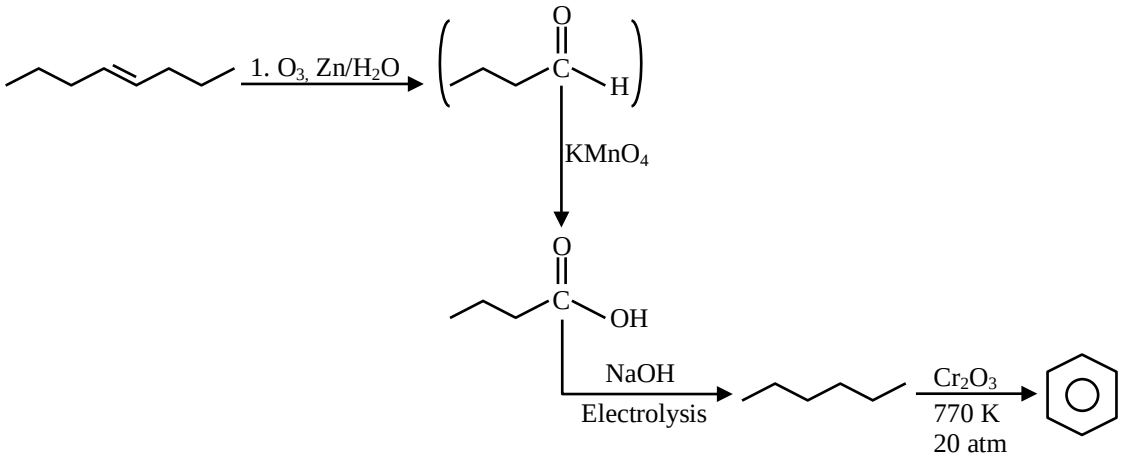
2. Ans. (2)

Sol.



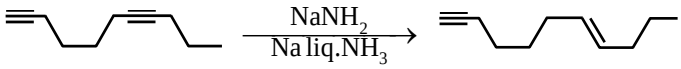
3. Ans. (0)

Sol.



4. Ans. (B)

Sol.



(B) is answer

5. Ans. (1.62)

Sol. $Mg_2C_3 + 4H_2O \rightarrow 2Mg(OH)_2 + CH_3C \equiv CH$

$$CH_3C \equiv CH \xrightarrow{NaMe_2} CH_3 - C \equiv C^-Na^+ \xrightarrow{MeI} CH_3–C\equiv C–CH_3(0.075\text{mmol})$$

(Q)

$$3CH_3 - C \equiv C - CH_3 \xrightarrow[\text{iron tube}\ 873K]{\text{red hot}} \text{benzene}$$

0.75 mole

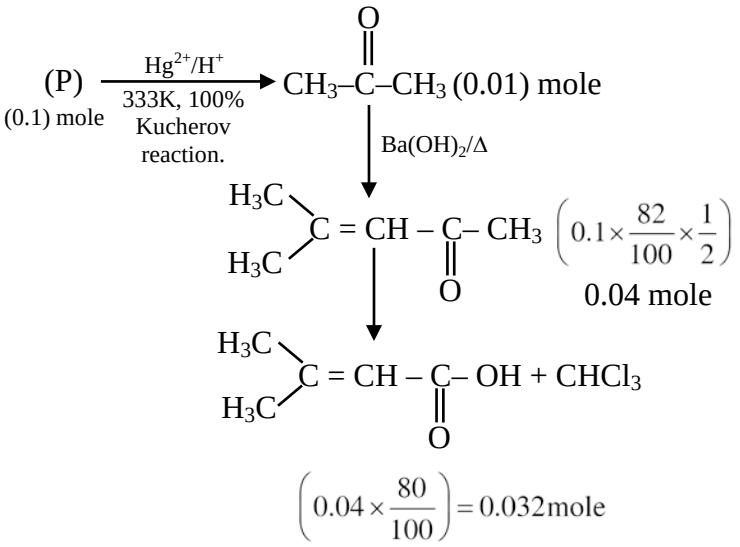
$(0.075 \times 0.4) \times$

$= 0.01$ mole

The value of x = 162 × 0.01 = 1.62 gm

6. Ans. (3.20 OR 3.90 TO 3.91)

Sol.

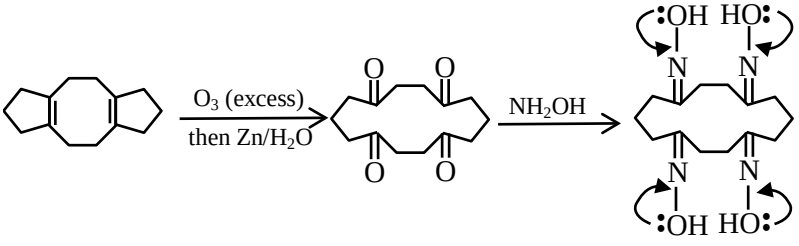


60 + 32 + 8 = 100

The value of Y = 0.032 × 100 = 3.2

7. Ans. (8 or 12)

Sol.



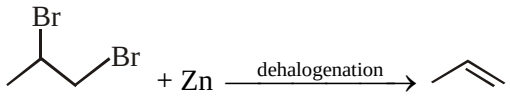
Total 12 atoms are sp^2 hybridised

8. Ans. (B, C)

Sol. $CH_3 – CH_2 – CH_2–CO_2Na + H_2O \xrightarrow{\text{electrolysis}}$ n-hexane

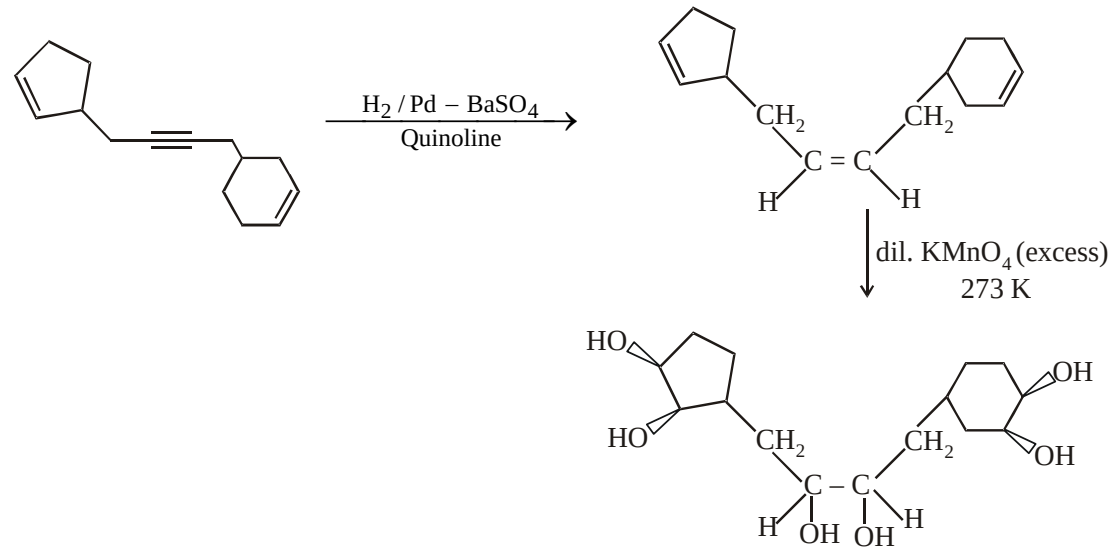
$CH_3 – CH_2 – CH_2 – CO_2Na \xrightarrow[\Delta]{NaOH + CaO} CH_3 – CH_2 – CH_3$

$CH_3 – CH_2 – CH_2–Cl + Zn \longrightarrow CH_3 – CH_2 – CH_2 – ZnCl \xrightarrow{\text{dil. HCl}} CH_3CH_2CH_3$



9. Ans. (6.00)

Sol.



total 6 –OH group present in a molecule of the major product.

10. Ans. (B)

Sol.