

Problema N. 1

A) $\lambda = \frac{\ln 2}{t_{1/2}} = \frac{0.693}{5730} = 1.2 \times 10^{-4} \text{ anni}^{-1}$ 15 p.

B) $t = \frac{t_{1/2}}{\ln 2} \times \ln(N_0/N) = \frac{5730}{0.693} \ln(13.6/11.0) =$
 $= 1752 \text{ anni}$

$1987 - 1752 = \text{anno } 235 \text{ d.C.}$ 35 p.

C) $13.6/11.0 = 1752 \text{ anni} = \text{anno } 235 \text{ d.C.}$

$13.6/11.2 = 1605 \text{ " } = \text{ " } 382 \text{ d.C.}$

$13.6/10.8 = 1887 \text{ " } = \text{ " } 100 \text{ d.C.}$

$\text{anno } 235 \left\{ \begin{array}{l} +147 \\ -135 \end{array} \right\} \text{ d.C.}$ 10 p.

D) $N = \frac{13.6 \times t_{1/2}}{\ln 2} = \frac{13.6 \times 5730 \times 365 \times 24 \times 60}{0.693} =$

$= 5.91 \times 10^{10} \text{ } ^{14}\text{C at/g carbonio}$

$1 \text{ g} = 0.989 \text{ } ^{12}\text{C} \quad 0.989 \text{ g } ^{12}\text{C} = 6.023 \times 10^{23} \text{ atomi } ^{12}\text{C}$

$^{12}\text{C} / ^{14}\text{C} = 8.40 \times 10^{11}$ 40,

100 p

Problema N. 2

Formule minime di (A) = $n(\text{CHO})_n$ 15 p.

" " " (B) = $\text{C}_2\text{H}_3\text{O}$ 5 p.

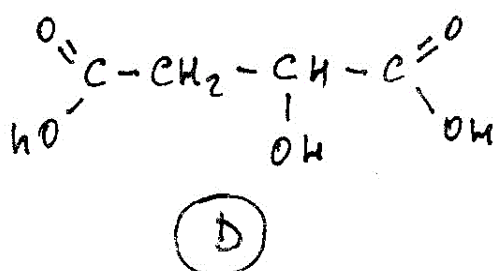
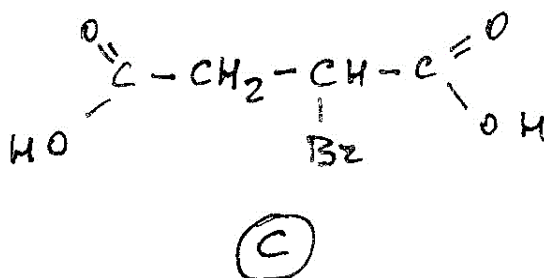
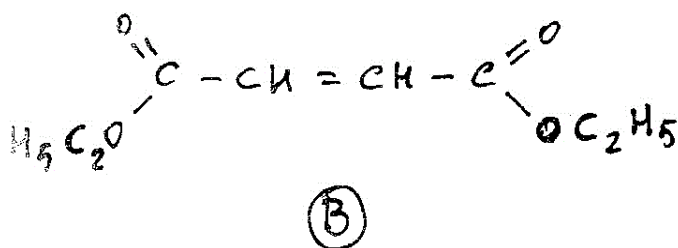
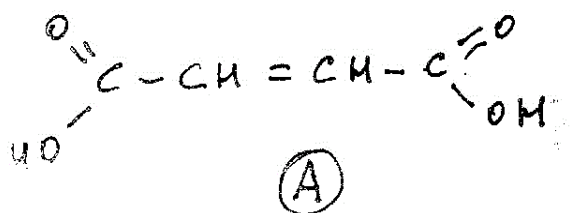
" " " (D) = $\text{C}_4\text{H}_6\text{O}_5$ 5 p.

(D) $\rightarrow \text{C}_4\text{H}_6\text{O}_5$ (134) che presenta due gruppi acidi 34 p.

Ciascuna struttura A, B, C, D 8 p.

Ciascuna reazione 3 p.

100 p.



SOLUZIONE DEL PROBLEMA N° 3

punti

- (1) $S + O_2 \rightarrow SO_2$
- (2) $2SO_2 + O_2 \rightarrow 2SO_3$
- (3) $SO_3 + H_2O \rightarrow H_2SO_4$
- (4) $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$
- (5) $2SO_4^{2-} - 2e^- \rightarrow S_2O_8^{2-}$
- (6) $SO_2 + 2KOH \rightarrow K_2SO_3 + H_2O$
- (7) $K_2SO_3 + S \rightarrow K_2S_2O_3$

- (8) $H_2 + S \rightarrow H_2S$
- (9) $H_2S + 2KOH \rightarrow K_2S + 2H_2O$
- (10) $K_2S + xS \rightarrow K_2S_{(x+1)}$

13
 3
 3
 3
 3
 3
 3
 3
 3
 3
 10

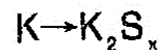
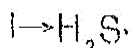
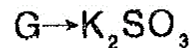
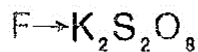
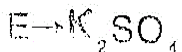
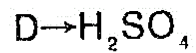
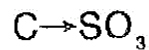
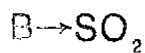
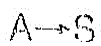
- (11) $SO_2 + 2H_2O + I_2 \rightarrow H_2SO_4 + 2HI$
- (12) $K_2SO_3 + H_2O + I_2 \rightarrow K_2SO_4 + 2HI$

- (13) $H_2S + I_2 \rightarrow 2HI + S$
- (14) $K_2S + I_2 \rightarrow 2KI + S$
- (15) $K_2S_x + I_2 \rightarrow 2KI + xS$

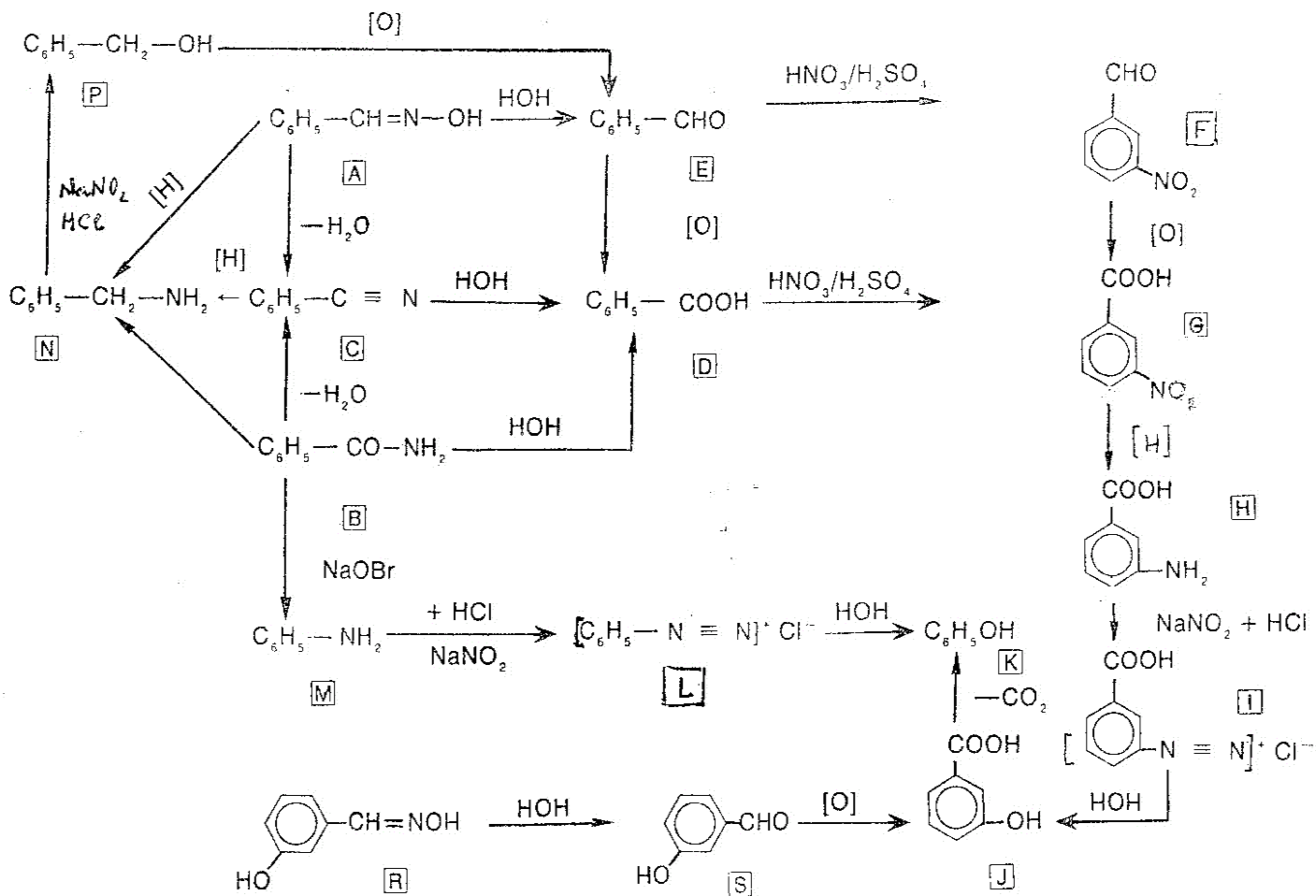
7
 6
 4
 5
 8

Totale

100 p.



SOLUZIONE DEL PROBLEMA N° 4



Individuazione dei composti A e B
 e del n C

Per ogni ulteriore composto appartenente
 alla sequenza di reazioni

B = 15
 18 p. ciascuno
 8 p.

4 p

100 p

Problema N. 5

- A) Per ciascuna equazione bilanciata 5 p.
- B) Determinazione del cromo 30 p.
- C) " di rame ed argento 55 p.
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- 100 p.