

**OLIMPIADA DE CHIMIE**  
**etapa județeană/municipiului București**  
**21 martie 2025**  
**Clasa a XI-a**

**BAREM DE EVALUARE ȘI DE NOTARE**

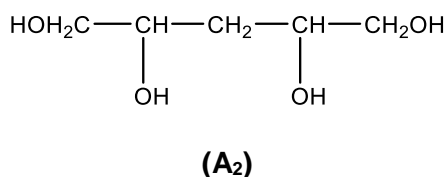
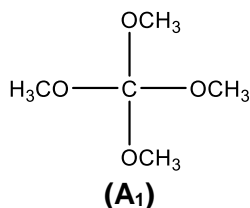
Se punctează corespunzător orice modalitate de rezolvare corectă a cerințelor.

**SUBIECTUL I**

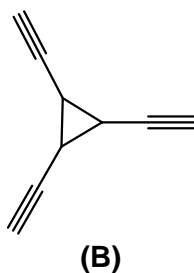
**28 de puncte**

**Subiectul A. ....21 puncte**

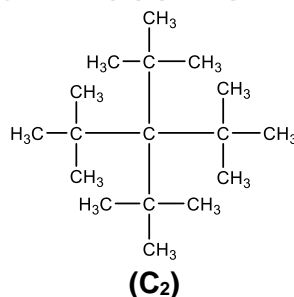
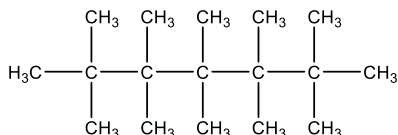
**I. a. scrierea formulelor de structură ale izomerilor (A<sub>1</sub>) și (A<sub>2</sub>) ai compusului (A) (2 x 1p = 2p)**



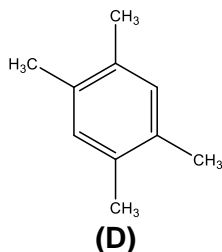
**b. scrierea formulei de structură a compusului (B) (1p)**



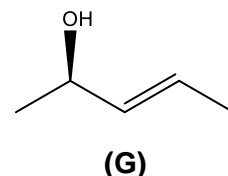
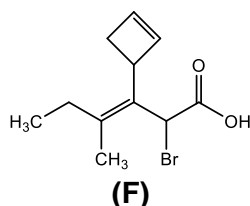
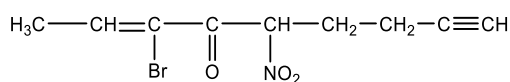
**c. scrierea formulelor de structură ale izomerilor (C<sub>1</sub>) și (C<sub>2</sub>) ai compusului (C) (2 x 1p = 2p)**



**d. scrierea formulei de structură a compusului (D) (1p)**

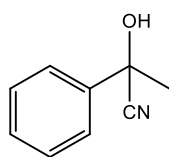


**II. e. scrierea formulelor de structură ale substanțelor notate cu literele (E), (F) și (G) (3 x 1p = 3p)**

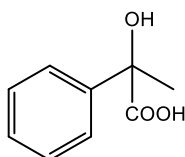


**f. notarea numărului de stereoizomeri ai substanței (F): 8 stereoizomeri (1p)**

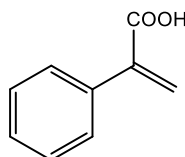
III. g. scrierea formulelor de structură ale substanțelor notate cu cifrele (1), (2), (3) și (4) (4 x 1p = 4p)



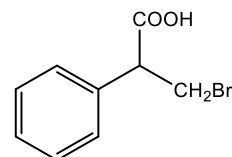
(1)



(2)

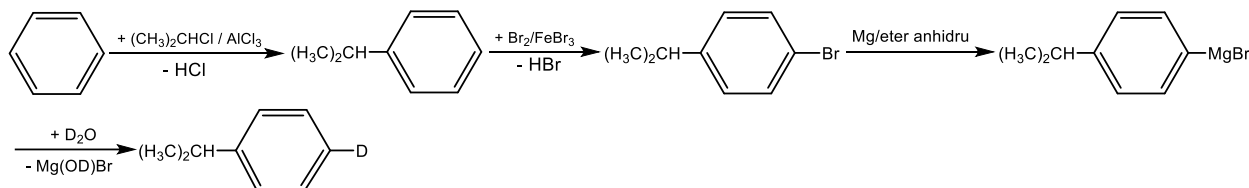


(3)



(4)

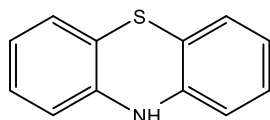
h. scrierea ecuațiilor reacțiilor prin care se poate sintetiza substanța (I), în cel mult patru etape (4 x 1p = 4p)



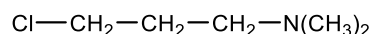
Dacă se depășește numărul de etape se acordă 50% din punctaj.

i. notarea numărului electronilor neparticipanți la legăturile chimice din molecula compusului (J): 8 electroni (1p)

j. scrierea formulelor de structură ale compuşilor (X) și (Y) (2 x 1p = 2p)



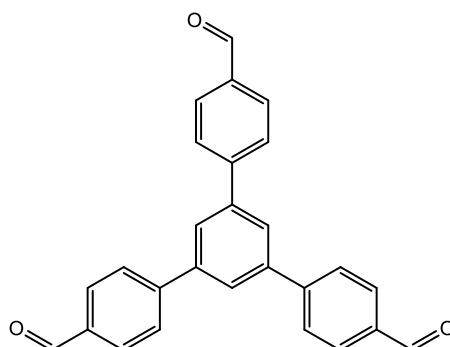
(X)



(Y)

Subiectul B. ....7 puncte

1. scrierea formulei de structură a compusului (Q) (1p)



(Q)

2. precizarea reactivului adecvat din listă pentru fiecare etapă din sinteză (5 etape x 1p = 5p)

Etapa 1: HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>

Etapa 2: Sn, HCl;

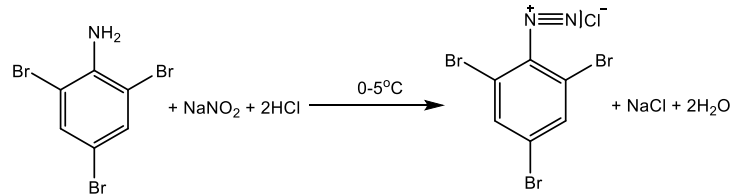
Etapa 3: Br<sub>2</sub>, H<sub>2</sub>O

Etapa 4: NaNO<sub>2</sub>, HCl

Etapa 5: H<sub>3</sub>PO<sub>2</sub>, H<sub>2</sub>O

3. scrierea ecuației reacției chimice din etapa 4 (1p)

Ministerul Educației și Cercetării  
Centrul Național de Politici și Evaluare în Educație

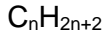


**SUBIECTUL al II-lea**

**26 de puncte**

**Subiectul A. ....11 puncte**

1. determinarea formulei moleculare a alcanului (0,5p)



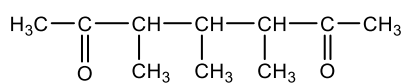
$$3n + 1 = 22$$



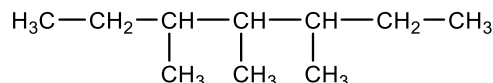
notarea punctului de fierbere:  $pf = 100^\circ C (\pm 5)$  (0,5p)

2. Pe măsură ce masa moleculară a alcanilor și a alcoolilor crește, cele două curbe se apropie una de cealaltă. Între moleculele alcoolilor cu mase moleculare mari, legăturile de hidrogen sunt încă posibile, dar interacțiunile datorate forțelor van der Waals de dispersie London cresc din cauza radicalului hidrocarbonat mai lung. Ca urmare, diferența de punct de fierbere între un alcool și un alcan cu masă moleculară comparabilă scade. (1p)

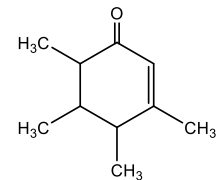
3. scrierea formulelor de structură ale compusilor (1), (2) și (4)



(1) (1p)

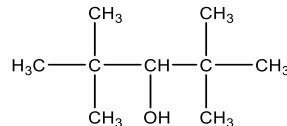


(2) (2p)



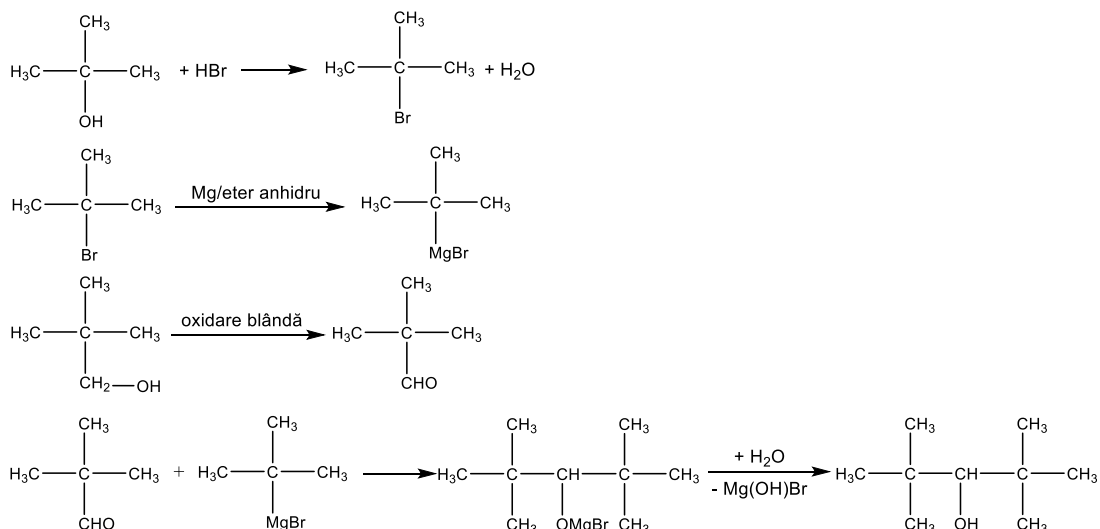
(4) (1p)

4. scrierea formulei de structură a unui izomer pentru alcoolul secundar (X) (1p)



(X)

5. scrierea ecuațiilor reacțiilor de obținere a izomerului (X) în cel mult cinci etape (5 x 0,8p = 4p)



Dacă se depășește numărul de etape se acordă 50% din punctaj.

**Subiectul B. ....10 puncte**

1. determinarea formulei moleculare a compusului (A) (1,5p)

$$147 \cdot (48,98/100) = 72 \text{ g carbon}$$

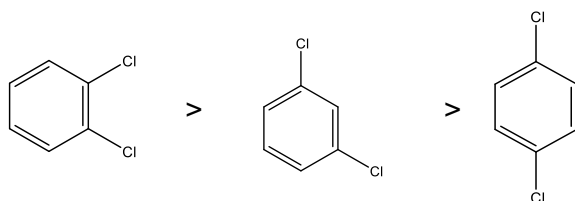
$$147 - 6 \times 12 - 4 \times 1 = 71 \text{ g/mol, deci compusul A este diclorbenzen, } C_6H_4Cl_2$$

Clasa a XI-a

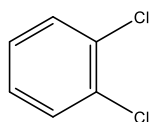
Barem de evaluare și de notare

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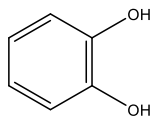
2. scrierea formulelor de structură ale celor trei izomeri (3 x 0,5p = 1,5p)  
ordinea descrescătoare a polarității moleculelor (0,5p)



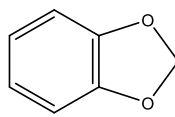
3. scrierea formulelor de structură ale compușilor (A<sub>1</sub>), (B), (C), (D), (E), (F) și (G).



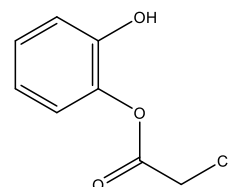
(A<sub>1</sub>) (0,5p)



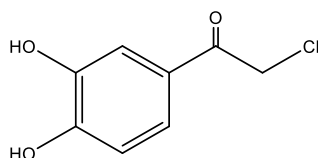
(B) (1p)



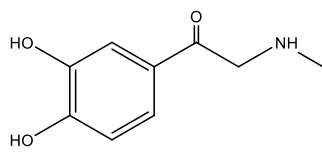
(C) (1p)



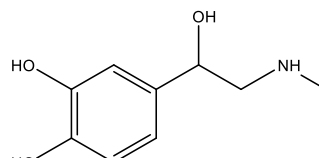
(D) (1p)



(E) (1p)

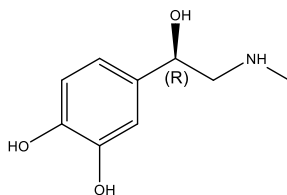


(F) (1p)

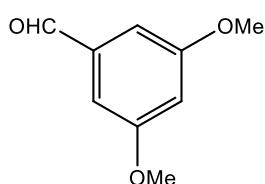


(G) (0,5p)

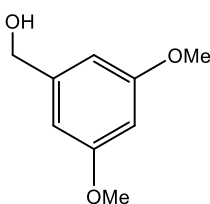
4. scrierea formulei de structură a enantiomerului compusului (G) cu configurația R (0,5p)



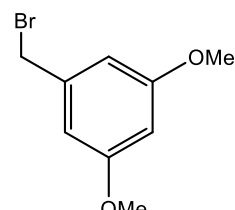
**Subiectul C.** .....5 puncte  
scrierea formulelor de structură ale compușilor (1), (2), (3), (5) și (6) (5 x 1p = 5p)



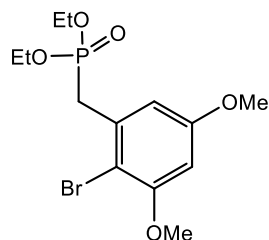
(1)



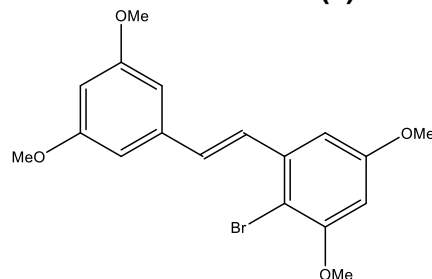
(2)



(3)



(5)

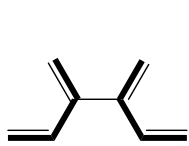


(6)

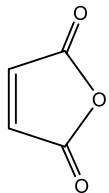
**SUBIECTUL al III-lea**

**18 de puncte**

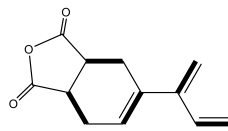
**Subiectul A.** .....4 puncte  
scrierea formulelor de structură ale compușilor (X), (Y), (A) și (B)



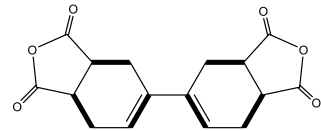
(X) (2p)



(Y) (0,5p)



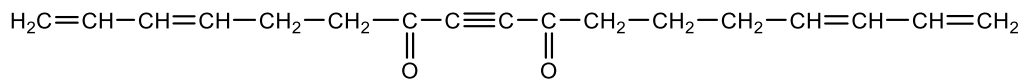
(A) (1p)



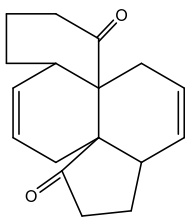
(B) (0,5p)

**Subiectul B.** .....4 puncte

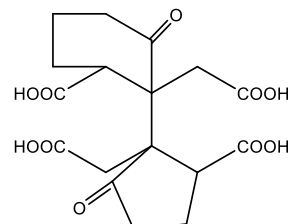
1. scrierea formulelor de structură ale compuşilor (X), (Y) și (Z) (3 x 1p = 3p)



(X)



(Y)



(Z)

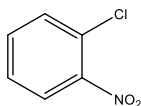
2. notarea numărului de stereoizomeri ai compusului (X): 4 stereoizomeri (0,5p)

3. notarea numărului de stereoizomeri ai compusului (X'): 4 stereoizomeri (0,5p)

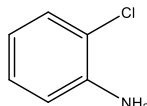
**Subiectul C.** .....10 puncte

scrierea formulelor de structură ale compuşilor (1), (2) (2 x 0,5p = 1p)

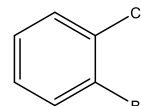
(3), (4), (5), (6), (7), (8), (9), (10) și (W) (9 x 1p = 9p)



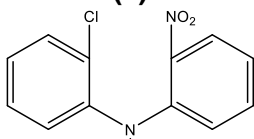
(1)



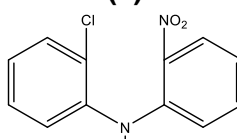
(2)



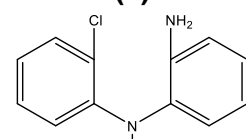
(3)



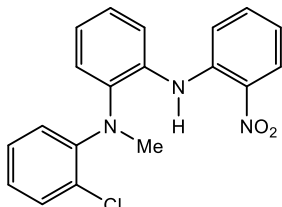
(4)



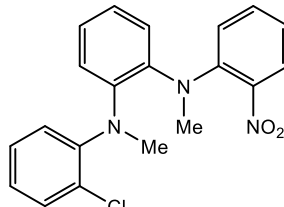
(5)



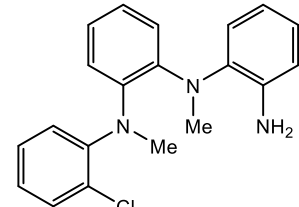
(6)



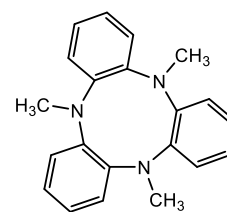
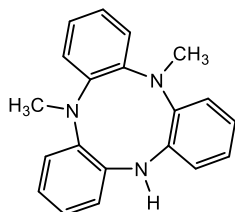
(7)



(8)



(9)



**SUBIECTUL al IV-lea**

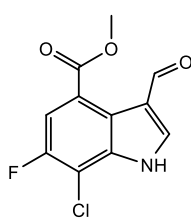
**28 de puncte**

**Subiectul A.** ..... **6 puncte**

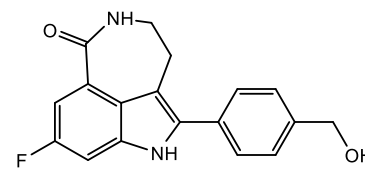
scrierea formulelor de structură ale compușilor notați cu **(1)**, **(2)**, **(4)** și **(5)**.



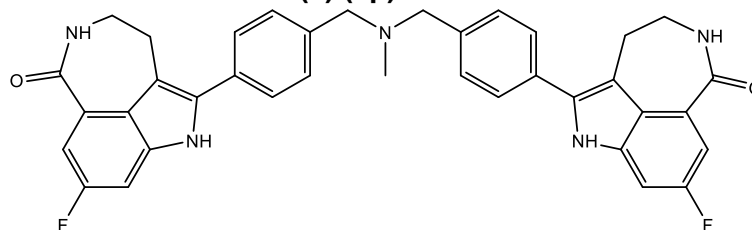
**(1) (1p)**



**(2) (1p)**



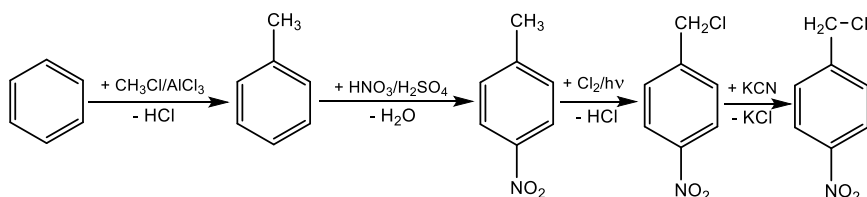
**(4) (2p)**



**(5) (2p)**

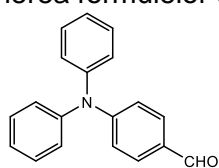
**Subiectul B.** ..... **11 puncte**

1. scrierea ecuațiilor reacțiilor de obținere a p-nitrofenilacetonitrilului, în patru etape (**4 etape x 0,75 p = 3p**)

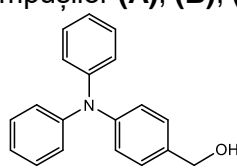


**Dacă se depășește numărul de etape se acordă 50% din punctaj.**

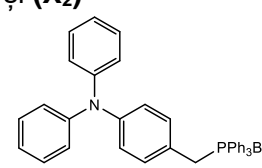
2. scrierea formulelor de structură ale compușilor **(A)**, **(B)**, **(C)**, **(D)**, **(X)**, **(X<sub>1</sub>)** și **(X<sub>2</sub>)**



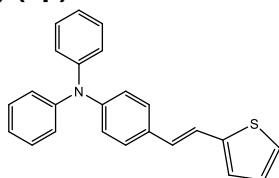
**(A) (1p)**



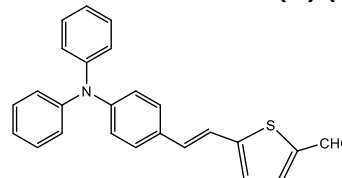
**(B) (1p)**



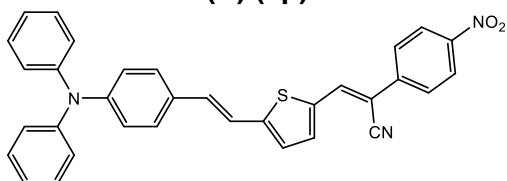
**(C) (1p)**



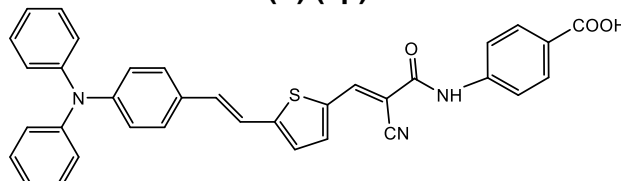
**(D) (1p)**



**(X) (1p)**



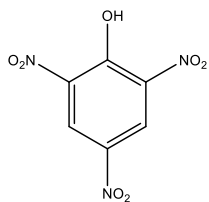
**(X<sub>1</sub>) (1p)**



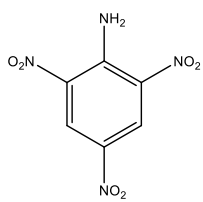
**(X<sub>2</sub>) (2p)**

**Subiectul C.** ..... **11 puncte**

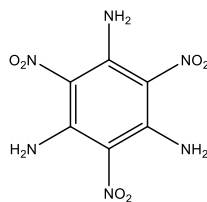
1. scrierea formulelor de structură ale compușilor (A), (B), (C), (D), (E), (F) și (G)



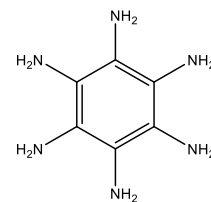
(A) (1p)



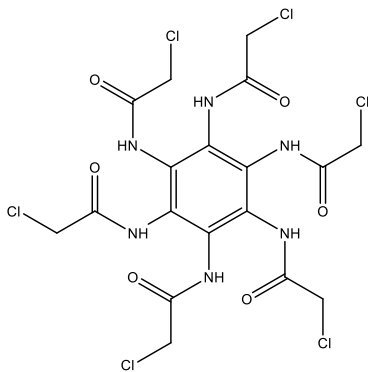
(B) (1p)



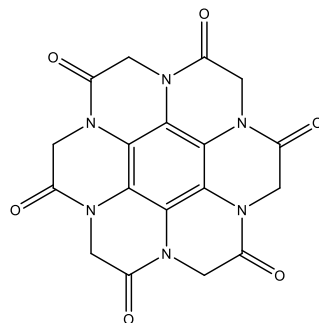
(C) (1p)



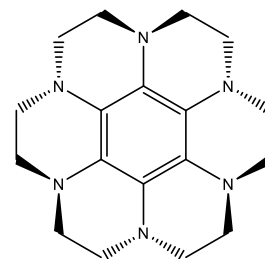
(D) (1p)



(E) (1p)

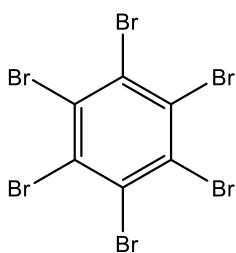


(F) (1p)

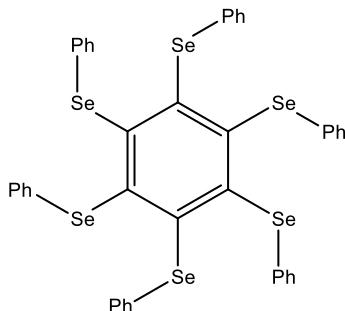


(G) (2p)

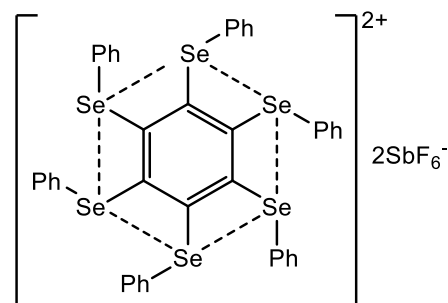
2. scrierea formulelor de structură ale compușilor (H), (I) și (J):



(H) (1p)



(I) (1p)



(J) (1p)

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