OLIMPIADA DE CHIMIE
etapa județeană/municipiului București
20 martie 2022
Clasa a XI-a

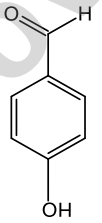
BAREM DE EVALUARE ȘI DE NOTARE

Orice modalitate de rezolvare corectă a cerințelor va fi punctată corespunzător.

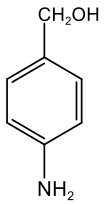
SUBIECTUL I **25 de puncte**

Subiectul A **19 puncte**

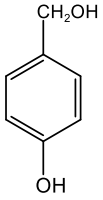
a.



(A)



(B)



(C)

(3 x 1 p=3 p)

b. 4-hidroxi-benzencarbaldehidă - reacția cu NaOH
- reacția cu Na_2CO_3

alcoolul 4-amino-benzilic - reacția cu HCl

alcoolul 4-hidroxi-benzilic - reacția cu NaOH
- reacția cu Na_2CO_3

(5 x 1p = 5 p)

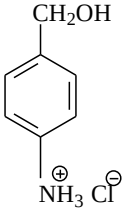
c. clorurare fotochimică; hidroliză **(3 p); dacă se depășește numărul de etape se acordă 1,5 p;**

d. diazotare; hidroliză; Cu, t^0C **(3 p); dacă se depășește numărul de etape se acordă 1,5 p;**

e. Separarea se face folosind pâlnia de separare.

Etape:

I. se tratează amestecul (B, C) cu HCl(aq) și eter sau alt solvent adecvat **(0,5 p + 0,5 p)**
- strat organic (1): (C), eter
- strat apos (2)



II. După separare:
- strat organic (1), eter și alcool 4-hidroxi-benzilic (C) $\xrightarrow{evaporare\ eter}$ alcool 4-hidroxi-benzilic (C) (pur) **(0,5 p + 0,5 p + 0,5 p);**
- stratul apos (2) se tratează cu NaOH(aq) + eter sau alt solvent adecvat **(0,5 p + 0,5 p).**

III. După separare:
- strat apos (NaCl)
- strat organic (3), eter și alcool 4-amino-benzilic (B) $\xrightarrow{evaporare\ eter}$ alcool 4-amino-benzilic (B) (pur) **(0,5 p + 0,5 p + 0,5 p)**

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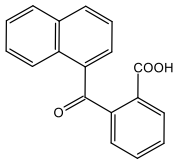
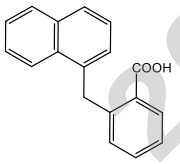
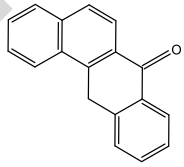
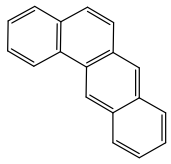
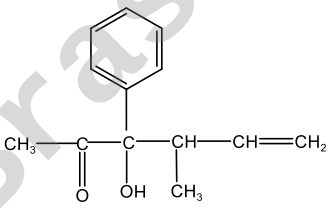
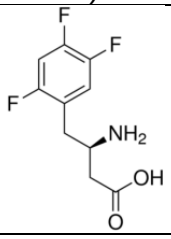
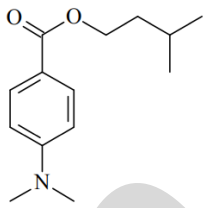
Subiectul B **6 puncte**

Substanța	B	C	D	X
Formula de structură				
Punctaj	**1,5 p**	**1,5 p**	**1,5 p**	**1,5 p**

SUBIECTUL al II-lea **20 de puncte**

1. a. (3 x 1 p = 3 p)

Substanța	(A) 3-hidroxi-3-fenil-4-metil-5-hexen-2-onă	(B) acid 3-amino-4-(2,4,5-trifluoro-fenil)-butanoic	(C) 4-(N,N-dimetilamino)-benzoat de 3-metilbutil
Formula de structură			
Punctaj	**1 p**	**1 p**	**1 p**

b. (A) 2 atomi de carbon asimetric **(2 x 0,5 p = 1 p)**

c. Ecuația reacției de hidroliză acidă (proces reversibil) **(1 p + 0,5 p)**

d. Ecuația reacției chimice a compusului A cu DNPH; N.E. (produs de reacție) = 12 **(1,5 p + 1 p)**

2. a. 2-hidroxibenzoat de 3,3,5- trimetilciclohexil **(1 p)**

b. N.E.(E) = 6 **(0,5 p)**

N.E.(G) = 10 **(0,5 p)**

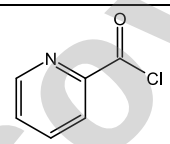
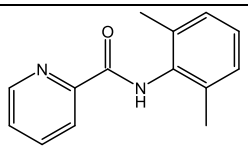
c. Izomerul de funcțiune al substanței D cu catena aciclică trebuie să aibă în moleculă:

- un atom de carbon asimetric
- o grupă carbonil de tip aldehidă
- o legătură dublă la care există izomerie geometrică.

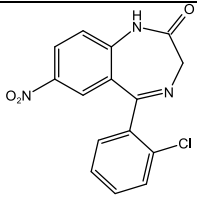
O formulă de structură corespunzătoare cerințelor **(2 p)**

d. Ecuația reacției compusului G cu $C_6H_5SO_2Cl$ la grupa $-NH_2$; produsul de reacție este neutru din punct de vedere acido-bazic. **(1 p + 1 p)**

e. (2 x 2 p = 4 p)

	
(X)	**(Y)**

f. (2 p)


(W)

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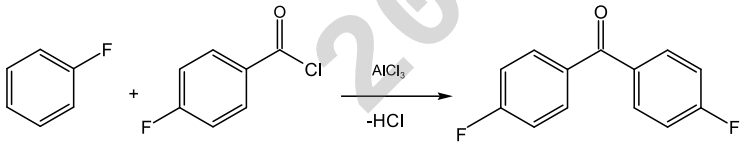
SUBIECTUL al III-lea — 25 de puncte

Subiectul A — 10 puncte

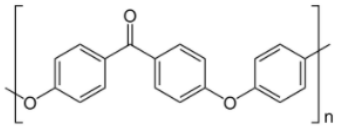
a. ecuația reacției **(2 p)**



denumirea compusului Y: 4,4'-difluorobenzofenonă (orice altă denumire corectă) **(1 p)**

b. ecuația reacției chimice a hidrochinonei cu Na_2CO_3 în raport molar 1 : 2 **(2 p)**

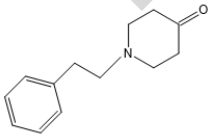
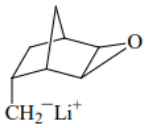
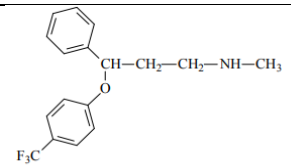
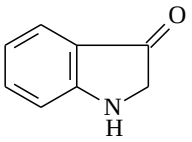
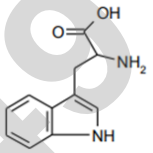
c. formula de structură a polimerului PEEK **(4p)**



d. NaF **(1 p)**

Subiectul B — 15 puncte

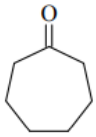
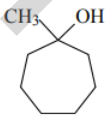
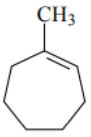
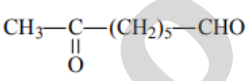
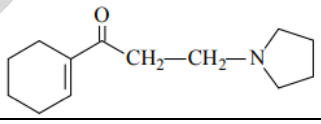
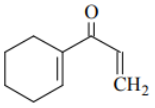
(5 X 3 p = 15 p)

				
(X)	(D)	(H)	(M)	(N)
3 p	**3 p**	**3 p**	**3 p**	**3 p**

SUBIECTUL al IV-lea — 30 de puncte

Subiectul A — 12 puncte

(6 x 2 p = 12 p)

Compusul	X	Y	Z
Formula de structură			
Punctaj	**2 p**	**2 p**	**2 p**
Compusul	T	W	Q
Formula de structură			
Punctaj	**2 p**	**2 p**	**2p**

Subiectul B — 18 puncte

a. 4 stereoizomeri **1 p**

b. acid 2-metil-6-oxoheptanoic **3 p**

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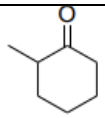
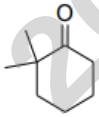
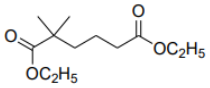
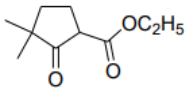
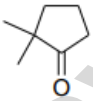
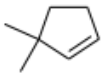
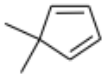
c. (7 x 2 p = 14 p)

Substanța	B	C	E	F
Formula de structură				
Punctaj	**2 p**	**2 p**	**2 p**	**2 p**
Substanța	G	I	X	
Formula de structură				
Punctaj	**2 p**	**2 p**	**2 p**	

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