

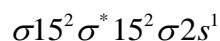
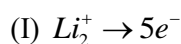
17. Considering MOT comment on the stability:

- (1) Li_2 stable Li_2^- unstable (2) Li_2 unstable Li_2^- stable
 (3) Li_2^+ unstable Li_2^- unstable (4) Li_2^+ stable Li_2^- stable

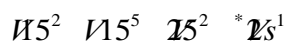
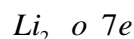
Answer:

(3)

Solution:



$$\text{Bond order} = \frac{N_b - N_A}{2} = \frac{3 - 2}{2} = \frac{1}{2}$$



$$\text{Bond order} = \frac{N_b - N_A}{2} = \frac{4 - 3}{2} = \frac{1}{2}$$

Both Li_2^+ , Li_2^- have same bond order. Unlikely 0.5 bond order does not exist so both Li_2^+ and Li_2^- are unstable.

If option were given as 1) $Li_2^+ > Li_2^-$

2) $Li_2^+ < Li_2^-$

3) $Li_2^+ = Li_2^-$

4) None of these

We can consider if same B.O is present, the species which is having lesser number of electrons present in anti-bonding orbital will be more stable so $Li_2^+ > Li_2^-$.

18. Which of the following property in a group decrease down the group and increase down the group respectively.

- (1) electronegativity and atomic radius
 (2) electronegativity and electro gain enthalpy
 (3) atomic radius and electronegativity
 (4) electro gain enthalpy and electronegativity

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Answer:

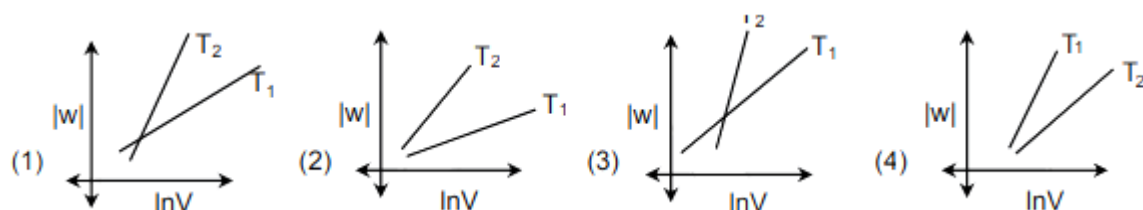
(1)

Solution:

On moving down the group electronegativity decreases.

On moving down the group atomic shell increases there by atomic radius increases.

19. Reversible isothermal expansion of gas for two temperature T_1 and T_2 ($T_2 > T_1$). Graph versus ($|w|$) and $\ln v$.



Answer:

(2)

Solution:

$$w = -nRT \ln \frac{v_f}{v_i} \rightarrow \text{constant is given same in all case.}$$

Take magnitude for W.

$$|w| = nRT \ln v_f - nRT V_i$$

$$T_2 > T_1$$

Lines cannot intersect and Intercept will be negative.

20. Which of the following properties is/are true for a silicone polymer?

A) Thermally resistant and have low dielectric constant

B) Resistant towards oxidation and used in grease

C) Biocompatible

D) Hydrophobic in nature

(1) A & B

(2) A, B & C

(3) B, C, & D

(4) A, B, C & D

Answer:

(4)

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Solution:

All, A, B, C and D are true for a silicone polymer – Concept from NCERT

21. Which of the following is a piezo electric material?

- (1) Silica (2) Quartz (3) Mica (4) Beryl

Answer:

(2)

Solution:

NCERT – SOLID STATE

Piezoelectric → These are the material that produce electrical potential when pressure is applied on parallel and perpendicular phases.

EX - Quarts.

22. Aluminium exist in +3 stable where as thallium exist in both +1 & +3 oxidation state. Reason for this is

- (1) Inert pair effect (2) Lanthanoid contraction
(3) Diagonal relationship (4) None of these

Answer:

(1)

Solution:

Due to inert pair effect thallium exist both 1+ and +3 oxidation state. But Thallium is stable in +1 oxidation state.

23. Maximum spin only magnetic moment for transition metal complex may be

- (1) 5.92 BM (2) 6.92 BM (3) 4.89 BM (4) 3.87 BM

Answer:

(1)

Solution:

In Transition metal complex maximum number of unpaired electron possible is 5 and it will be present in d sub shell

$$\text{Formula } \rightarrow = \sqrt{n(n+2)}BM$$

$n \Rightarrow$ no of impaired electron

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$$= \sqrt{5(5+2)} = 5.92 \text{ BM}$$

24. Match the following drugs with correct functional group test

- | | |
|--------------------|-----------------------------|
| A) Chloroxylenol | P) Carbylamine |
| B) Penicillin | Q) Baeyer's reagent |
| C) Sulpha Pyridine | R) $FeCl_3$ test |
| D) Norethindrone | S) Sodium hydrogen sulphate |

(1) A → R, B → P, C → S, D → Q

(2) A → S, B → R, C → P, D → Q

(3) A → R, B → S, C → P, D → Q

(4) A → Q, B → R, C → P, D → S

Answer:

(2)

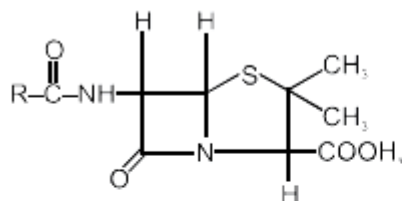
Solution:

Penicillin contains COOH group – respond to sodium hydrogen sulphate test.

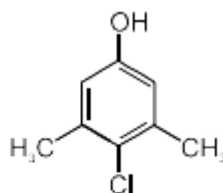
Chloroxylenol contains OH group – respond to neutral $FeCl_3$ test

Sulpha pyridine NH_2 group – respond to carbylamines test

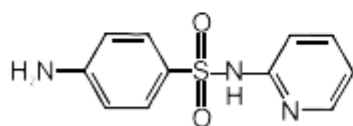
Norethindrone $C \equiv CH$ – respond to Bayer's test



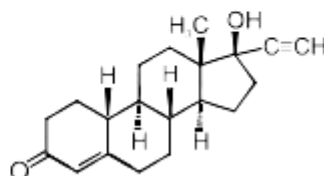
Penicillin



Chloroxylenol

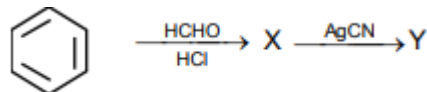


Sulphapyridine



Norethindrone

25. Product X → Y will be



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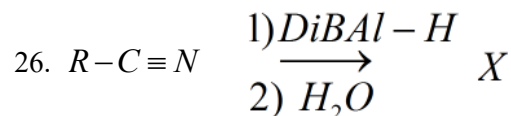
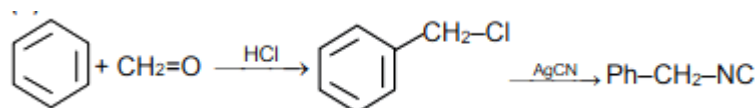
CENTRE:

- | | |
|------------------|--------------|
| (1) $Ph-CH_2-Cl$ | $Ph-CH_2-NC$ |
| (2) $PhCH_2OH$ | $Ph-CH_2-CN$ |
| (3) $PhCH_2Cl$ | $Ph-CH_2-CN$ |
| (4) $Ph-OH$ | $Ph-CH_2-CN$ |

Answer:

(1)

Solution:



X will be

- (1) $R-CH=O$ (2) $R-CH_2-NH_2$ (3) $R-COOH$ (4) $R-NH_2$

Answer:

(1)

Solution:

Classical reduction \longrightarrow Aldehyde is formed.

27. Arrange the following amino acids in order of their PKa order.

Lysine, Aspartic acid, Arginine, Glycine.

- (1) $lys > Arg > Gly > Asp$ (2) $Arg > Lys > Asp > Gly$
(3) $Gly > Asp > Arg > Lys$ (4) $Arg > Lys > Gly > Asp$

Answer:

(4)

Solution:

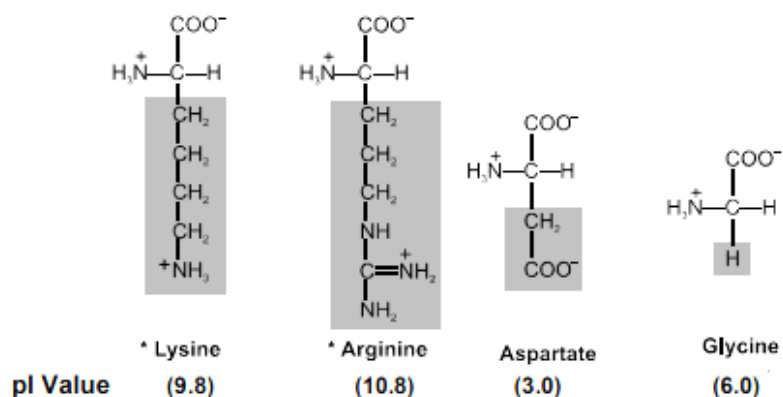
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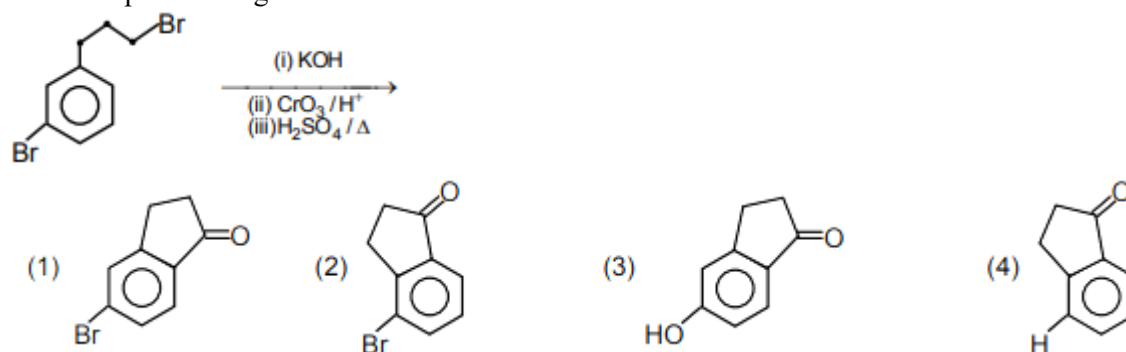
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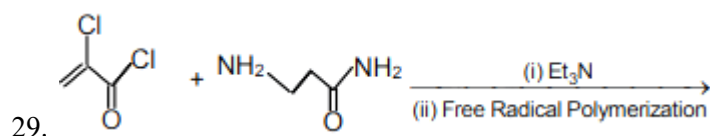
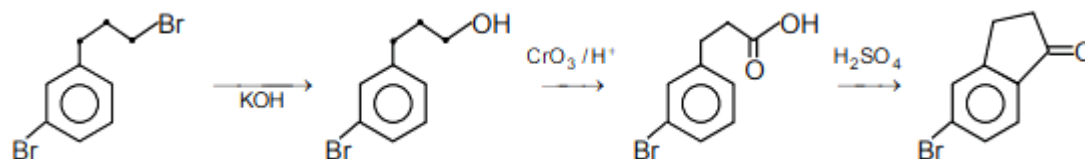


28. Write the product of given reaction:

**Answer:**

(1)

Solution: It involves nucleophilic substitution reaction (SN²) followed by oxidation with oxidising agent and removal of water molecule.



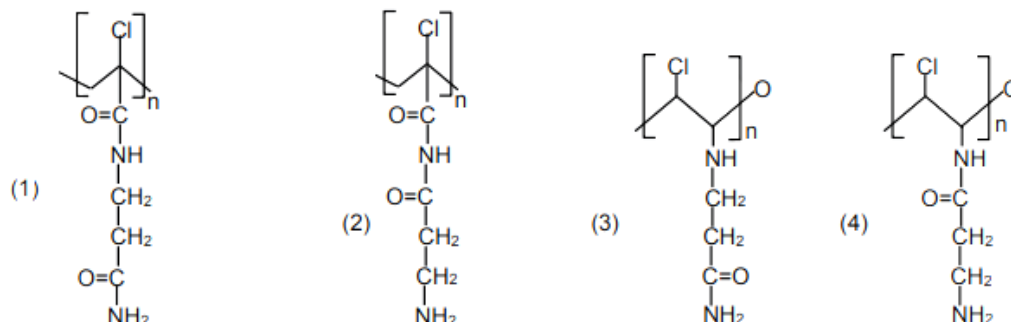
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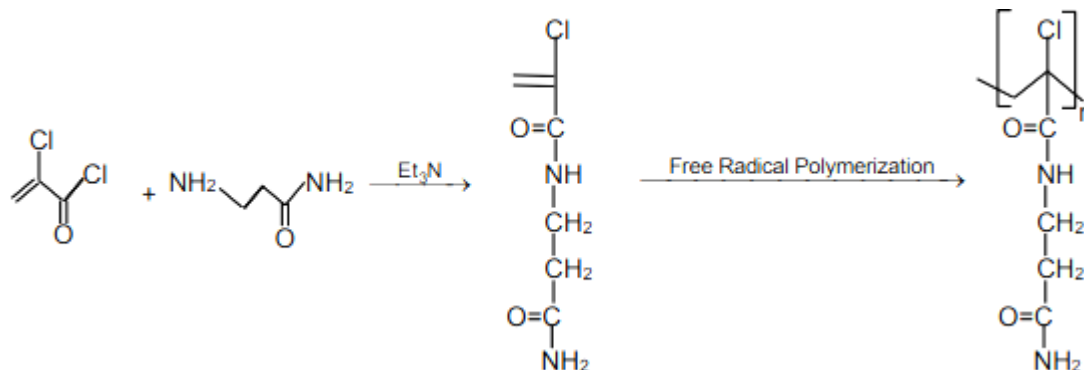
CENTRE:



Answer:

(1)

Solution:



30. Consider the compound A $[Cr(H_2O)_6]Cl_3$; yellow B $[Cr(NH_3)_6]Cl_3$; violet. Then which of the following is incorrect.

(1) $(\Delta_0)_A < (\Delta_0)_B$

(2) The crystal field splitting parameter can be measured by wavelengths of complementary colors for (A) and (B) respectively

(3) Both are paramagnetic with three unpaired electrons each.

(4) the crystal field splitting parameter can be measured by wavelength of yellow and violet colors for (A) and (B) respectively.

Answer:

(4)

Solution:

The crystal field splitting parameter can't be measured by wavelength of yellow and violet colours for (A) & (B) respectively.