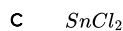
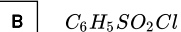
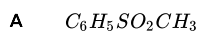


#1611916

Topic: Chemical reactions of amines

Which of the following is Hinsberg reagent ?

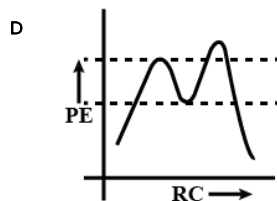
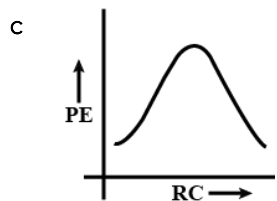
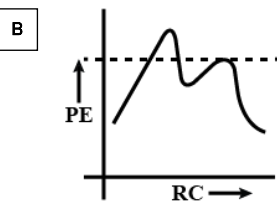
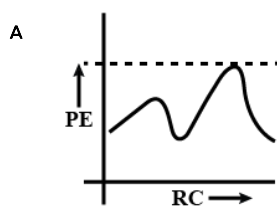


Solution

Solution:- (B) $C_6H_5SO_2Cl$ Hinsberg reagent is benzene sulphonyl chloride ($C_6H_5SO_2Cl$).

#1611919

Topic: Chemical reactions of haloalkanes - Substitution reactions

Which of the following is potential energy diagram for S_N1 reaction ?

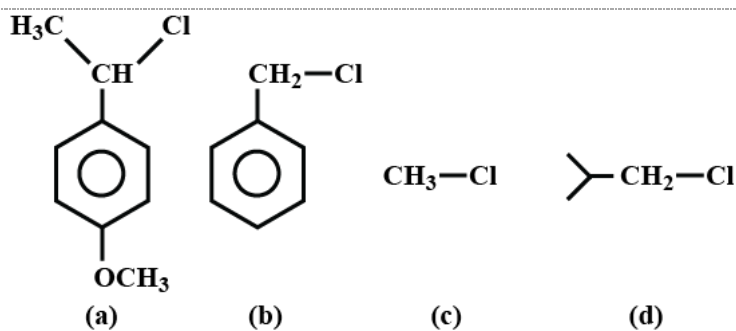
Solution

Solution:- (B)

 S_N1 is a two step reaction in which first step is rate determining step. Hence the peak of first step is higher than second step.

#1611921

Topic: Chemical reactions of haloalkanes - Substitution reactions



Reactivity order of S_N1 reaction for the following compounds is:

- A $a > b > c > d$
- B $a > d > c > b$
- C $c > d > b > a$
- ☒ D $a > b > d > c$

Solution

Solution:- (D) $a > b > d > c$

The S_N1 reactivity is proportional to stability of carbocations formed in the rate determining step.

The order of stability of carbocation is given as:

tertiary > secondary > Primary

Thus the order of reactivity towards S_N1 reaction is given as:

$a > b > d > c$

#1611924

Topic: Ozone

The atmosphere between the heights 10 to 50 kilometer above the sea level is :

- A troposphere
- ☒ B stratosphere
- C mesosphere
- D ionosphere

Solution

Solution:- (B) Stratosphere

Stratosphere lies between 10 to 50 Km. from sea level.

#1611927

Topic: Medicines

Noradrenaline is one of the example of :

- A anti-depressant
- B anti-Histamine
- ☒ C neurotransmitter
- D antacid

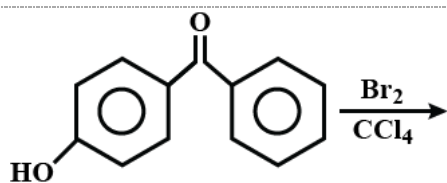
Solution

Solution:- (C) Neurotransmitter

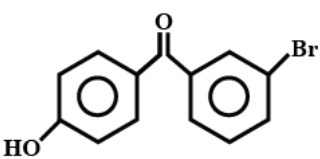
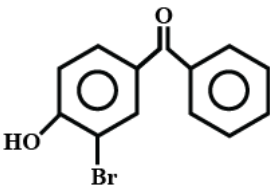
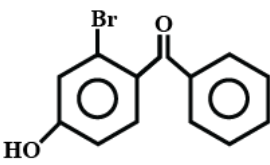
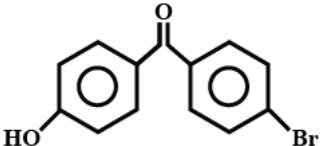
Noradrenaline is one of the example of Neurotransmitter

#1611930

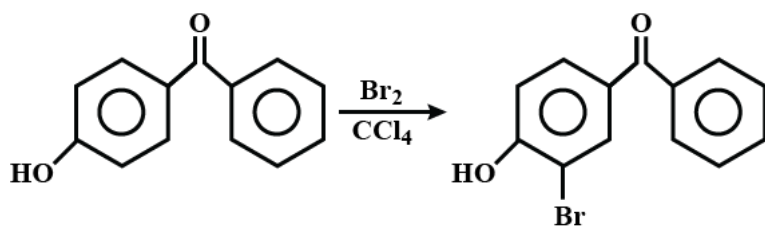
Topic: Types of organic reactions



The product of following reaction is:

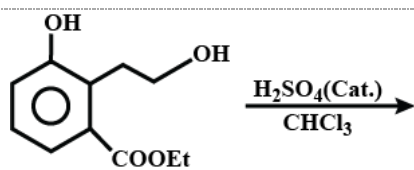
- A 
- ☒ B 
- C 
- D 

Solution

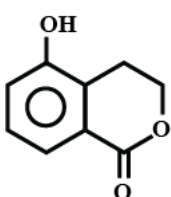
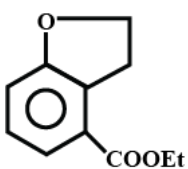


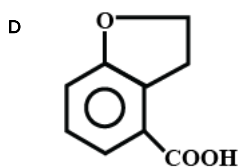
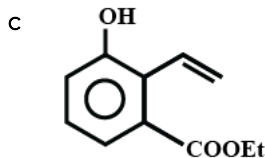
#1611933

Topic: Chemical Properties of carboxylic acids



The product of following reaction is :

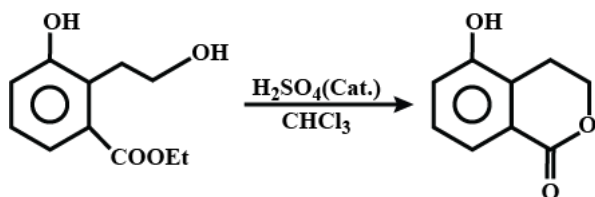
- A 
- B 



Solution

Solution:- (A)

It is acid catalysed intermolecular esterification reaction



#1611936

Topic: Preparation of some addition polymers

Monomer of $[NH - \overset{\overset{O}{\parallel}}{C} - NH - CH_2]_n$ is :

- A Methanamine
 B N-methyl urea
☒ C Formaldehyde
 D Ammonia

Solution

Solution:- (C) Formaldehyde

It is urea formaldehyde polymer and its monomers are urea and formaldehyde.

#1611938

Topic: Proteins

Which can give both carbylamine test and carric ammonium nitrate test ?

- A Asn-Gln
 B Lys-Gln
 C Asp-Lys
☒ D Lys-Ser

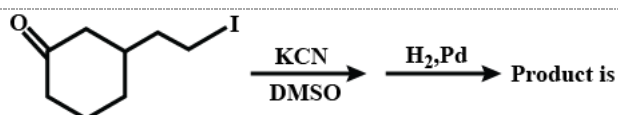
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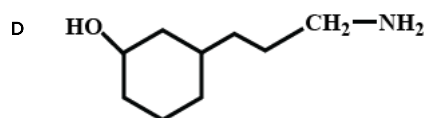
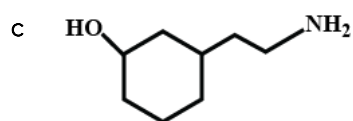
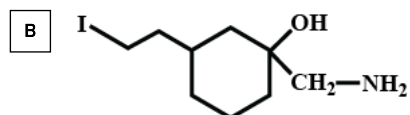
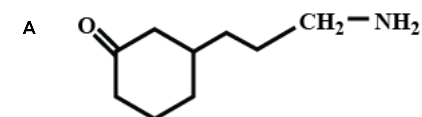
Solution:- (D) Lys-Ser

In Lys-ser, amine and alcoholic group are present respectively hence it will show positive test with carbyl amine and ceric ammonium nitrate

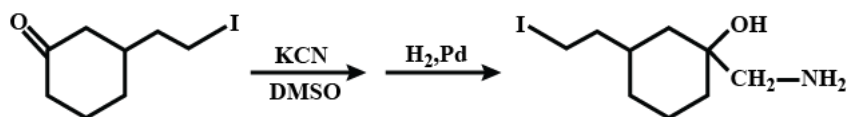
#1611940

Topic: Chemical reactions of haloarenes





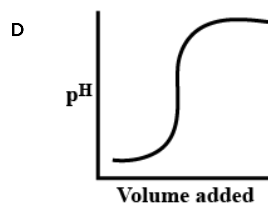
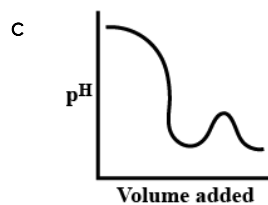
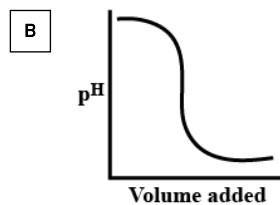
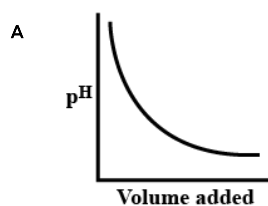
Solution



#1611942

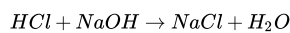
Topic: pH

0.1 M HCl is added to an unknown strength of NaOH solution. Identify the correct diagram:



Solution

Solution:- (B)



at equivalent point $p^H = 7$ and at end point solution will be acidic

#1611947

Topic: First law of thermodynamics

Calculate ΔU if 2 kJ heat is released and 10 kJ work is done on the system.

A 12 kJ **B** 8 kJ C -8 kJ D -12 kJ **Solution**Solution:- (B) 8 kJ

$$q = -2\text{ kJ}$$

$$w = +10\text{ kJ}$$

$$\Delta U = q + w = -2 + 10 = +8\text{ kJ}$$

#1611951**Topic:** Quantitative aspect of electrolysis and Faraday's law0.1 F charge is supplied to a solution of $\text{Ni}(\text{NO}_3)_2$. Then the amount of Ni deposited (in mol) at the cathode will be :**A** 0.05

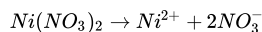
B 1.0

C 0.5

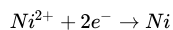
D 0.10

Solution

Solution:- (A) 0.05



at cathode :



$$2F \rightarrow 1\text{ mole}$$

$$0.1 F \rightarrow \frac{0.1}{2} = 0.05\text{ mole}$$

#1611954**Topic:** Depression in freezing pointCalculate depression in freezing point of 0.03 m solution of K_2SO_4 (assumed completely ionised) in a solvent with $K_f = 4\text{ K Kg mol}^{-1}$ **A** 0.36 K

B 0.12 K

C 0.48 K

D 0.24 K

Solution

Solution:- (A) 0.36 K

$$\Delta T_f = iK_f m$$

$$= 3 \times 4 \times 0.03$$

$$= 0.36\text{ K}$$

#1611956**Topic:** Silicon

Which of the following is amorphous form of silica?

A Quartz

B Kieselguhr

C Tridymite

D Cristobalite

Solution

Solution:- (B) Kieselguhr

kieselguhr is an amorphous form of silica.

#1611958

Topic: Concentrations

20% $\frac{W}{W}$ Kl will have molality _____ (Given $GMM = 166gm$)

A 1.35

B 1.51

C 1.48

D 1.30

Solution

Solution:- (B) 1.51

20 gm Kl is present in 100gm solution

$$\text{Weight of solute} = \frac{20}{166}$$

$$m = \frac{20}{166 \times 80} \times 1000 \approx 1.51$$

#1611965

Topic: Behaviour of real gases - Deviations from ideal behaviour

At a constant temperature Ne , Ar , Kr and Xe deviate from ideal behavior according to equation

$$P = \frac{RT}{V_m - b}$$

Where b is vanderwaal's constant. The Z vs P graph would be steepest for which of the following?

A Ne

B Ar

C Kr

D Xe

Solution

Solution:- (D) Xe

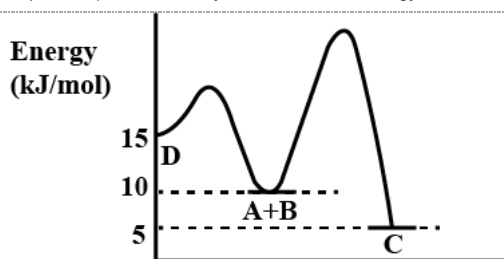
$$Z = 1 + \frac{Pb}{RT}$$

At constant T, slope of Z vs P graph $\propto b$

Xe has the maximum radii & hence maximum b & hence its graph will be steepest.

#1611968

Topic: Temperature, catalyst and activation energy of reactions



Which of the following statement is incorrect about the given energy profile diagram?

A C is thermodynamically most stable

B D is kinetically most stable

C Activation energy for making $A + B$ from C is the maximum

D Enthalpy to form C is 5kJ less than to that to form D.

Hint

$$E_D - E_C = 15 - 5 = 10 \text{ kJ/mol}$$

Solution

$$E_D - E_C = 15 - 5 = 10 \text{ kJ/mol}$$

Thus enthalpy to form C is 10 kJ less than to that to form D .

#1611971

Topic: Close packing in crystals

Molecules from 10 mL of 1 M surfactant solution are adsorbed on 0.24 cm^2 area forming unimolecular layer. Assuming surfactant molecules to be cube in shape, determine the edge length of the cube.

- ☒ **A** 2 pm
- ☐ **B** 2 fm
- ☐ **C** 1 pm
- ☐ **D** 1 fm

Solution

Solution:- (A) 2 pm

Total area = area covered by one particle \times Number of particles

$$\therefore 0.24 = a^2 \times \frac{10^{-3} \times 10}{10^3} \times N_A$$

$$a = 2 \times 10^{-10} \text{ cm} = 2 \text{ pm}$$

#1611976

Topic: Valence bond theory

Which of the following statements is incorrect for $1s$ orbital of hydrogen atom ?

- ☐ **A** It is possible to find an electron at a distance $2a_0$ (a_0 = Bohr radius)
- ☐ **B** The magnitude of potential energy is twice of kinetic energy for a given orbit
- ☒ **C** The total energy of an electron is maximum in its first orbit.
- ☐ **D** The probability density of finding an electron is maximum at the nucleus

Solution

Solution:- (C)

The total energy of the electron is minimum in its first orbit in H -atom. Thus statement C is incorrect

#1611979

Topic: Molecular orbital theory

Which of the following is diamagnetic?

- ☐ **A** O_2
- ☒ **B** CO
- ☐ **C** B_2
- ☐ **D** NO

Solution

Solution:- (B) CO

According to MOT , O_2 , B_2 & NO are paramagnetic, only CO is diamagnetic.

#1611983

Topic: Actinoids

Maximum oxidation state is shown by which pair of elements?



- A** Np, Pu
- B** Cf, Bk
- C** Np, Pr
- D** Ac, Th

Solution

Solution:- (A) Np, Pu

Np & Pu : +3, +4, +5, +6, +7

Cf & Bk : +3 & +3, +4, respectively

Np & Pr : +3

Ac & Th : +3 & 4 respectively

#1611985

Topic: General Introduction

Which of the following is not a carbonate ore?

- A** Calamine
- B** Siderite
- C** Bauxite
- D** Malachite

Solution

Solution:- (C) Bauxite

Calamine : $ZnCO_3$

Siderite : $FeCO_3$

Bauxite : $AlO_x(OH)_{3-2x}$ ($0 < x < 1$)

Malachite : $CuCO_3 \cdot Cu(OH)_2$

#1611994

Topic: Group 13 elements : Boron family

Which of the following statements is/are correct ?

- I. B_2O_3 is an acidic oxide
- II. Ga_2O_3 and Al_2O_3 are amphoteric oxides.
- III. In_2O_3 and Tl_2O_3 are basic oxides.

- A** I, II, III
- B** I, II
- C** II, III
- D** I, III

Solution

Solution:- (A) I, II, III

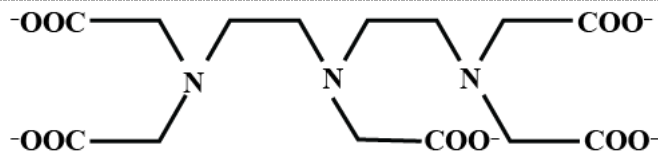
B_2O_3 is acidic oxide

Al_2O_3 and Ga_2O_3 are amphoteric oxides

In_2O_3 and Tl_2O_3 are basic oxides.

#1611998

Topic: Important terms used in coordination compounds



The coordination number of the complex formed by this ligand with 3d transition metal and the inner transition metal is _____ respectively.

- A 6 and 6
B 8 and 6
☒ C 6 and 8
D 8 and 8

Solution

Solution:- (C) 6 and 8

Common CN of transition elements = 6

Common CN of inner transition elements = 8 and 12

#1612000

Topic: Valence bond theory

With reference to Valence Bond Theory in coordination compounds which of the following statements is/are, correct?

- I. VBT does not explain the colour exhibited by co-ordination compounds.
II. VBT explains and gives a quantitative interpretation of magnetic data.
III. VBT does not distinguish between weak field ligand and strong field ligand.

- A I, II, III
B I, II
C II, III
☒ D I, III

Solution

Solution:- (D) I, II

VBT does not explain the colour exhibited by co-ordination compounds.

VBT does not explain and gives quantitative interpretation of magnetic data.

VBT does not distinguish between weak field ligand and strong field ligand.

#1612002

Topic: General Introduction

Assertion

Iron is extracted from Haematite ore

Reason

Haematite is carbonate ore

- A Both Assertion and Reason are correct and Reason is the correct explanation for Assertion
B Both Assertion and Reason are correct but Reason is not the correct explanation for Assertion
☒ C Assertion is correct but Reason is incorrect
D Both Assertion and Reason are incorrect

Solution

Haematite is Fe_2O_3 .

Thus it is an ore of iron but is an oxide ore, not carbonate ore.

Thus Assertion is correct but the Reason is incorrect.

#1612005

Topic: Hydrogen bonding

Why does HF has the maximum boiling point amongst all hydrogen halides ?

- ☒ **A** Due to hydrogen bonding
- ☐ **B** Due to Vander Waal's forces
- ☐ **C** Due to minimum molecular mass
- ☐ **D** None of these

Solution

Solution:- (A) Due to hydrogen bonding

Due to Hydrogen bonding HF has high Boiling point amongst Hydrogen halides.