

[This question paper contains 5 printed pages.]

1215

Your Roll No. ....

**B.Sc. (Hons.)/I**

**A**

**PHYSICS – Paper V**

**(Inorganic/Organic Chemistry)**

*Time : 3 Hours*

*Maximum Marks : 38*

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

**Note :** *Use separate answer-books for Sections A and B.*

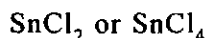
**SECTION A**

**(Marks : 19)**

*Question No. 1 is compulsory.*

*Attempt three questions.*

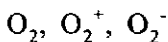
1. (a) Cr(II) and Cu(II) show tetragonally distorted octahedral structures. Justify.
- (b) Why are ionic crystals hard but brittle while metals are hard, malleable and ductile ?
- (c) Which of the following compounds will have higher B.P. ? Justify your answer :
  - (i) HF or HCl
  - (ii) o-nitrophenol or p-nitrophenol
- (d) Which will be more covalent and why ?



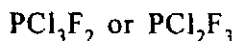
(2,2,2,1)

P.T.O.

2. (a) Write MO diagram for the following and arrange them in order of increasing stability :



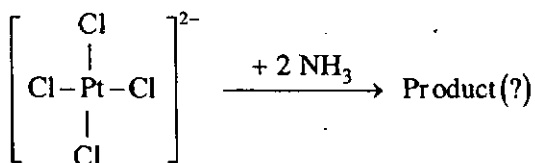
- (b) Which will be more stable and why ?



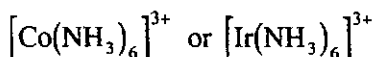
- (c) Compare the stability of 1e, 2e and 3e bonds.

(2,2,2)

3. (a) What is trans-effect ? Predict the product in the following reaction :



- (b) Which complex has higher magnitude of  $\Delta_0$  and why ?



- (c)  $\text{BaSO}_4$  is ionic in nature but it is insoluble in water, why ?

(2,2,2)

4. (a) What is crystal field theory ? Explain.

- (b) Calculate the CFSE of octahedral high spin and low spin complexes corresponding to  $d^5$  configuration.

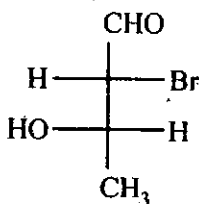
- (c) Explain Electrostatic polarisation theory and  $\pi$  bonding theory of trans effect. (2,2,2)

### SECTION B

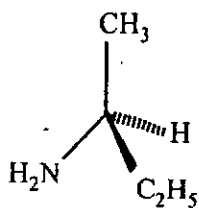
Attempt any three questions.

Q. No. 1 carries 7 Marks.

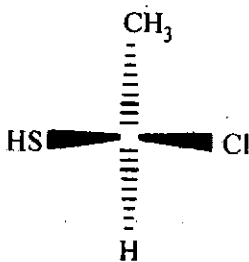
1. (a) Using Sequence rules, assign R/S configuration to the following :



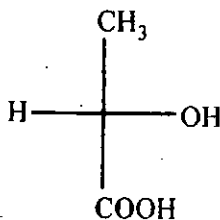
(i)



(ii)



(iii)



(iv)

(4)

- (b) Define aromaticity and indicate which of the following is aromatic ?



(i)



(ii)

(3)

2. (a) Draw the Newmann projection for anti, gauche and fully eclipsed conformation of 1,2-dichloroethane and indicate which will be more stable and why? (3)

(b) What happens when methyl magnesium iodide reacts with

(i) Ethane nitrile followed by hydrolysis

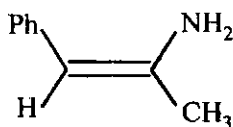
(ii) Methanal followed by hydrolysis (3)

3. (a) Discuss and give mechanism for any **one** of the following name reactions

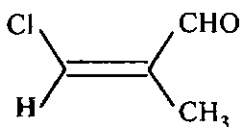
(i) Aldol condensation

(ii) Perkin condensation (4)

(b) Using sequence rules, assign E/Z notations to the following geometrical isomers:



(i)

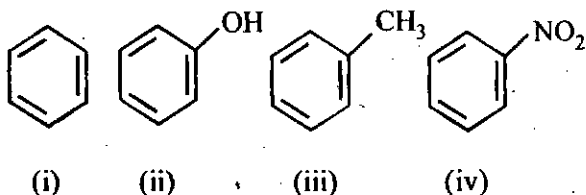


(ii)

(2)

4. Attempt any three from the following :

- (a) Giving reasons, indicate the increasing order of reactivity towards electrophilic substitution reactions for the following compounds :



- (b) Out of ethanamine and aniline, which one is more basic and why ?

- (c) Which of the following will give Iodoform test and why ?

- (i) Pentan-2-one            (ii) ethanal  
(iii) methanol            (iv) butan-2-ol

- (d) Why tertiary haloalkanes undergo nucleophilic substitution via  $S_N1$  mechanism ?            (2×3)