

X


<https://swayam.gov.in>

https://swayam.gov.in/nc_details/NPTEL

reviewer4@nptel.iitm.ac.in ▾

[NPTEL \(https://swayam.gov.in/explorer?ncCode=NPTEL\)](https://swayam.gov.in/explorer?ncCode=NPTEL) » [Basics in Inorganic Chemistry \(course\)](#)
[Announcements \(announcements\)](#) [About the Course \(https://swayam.gov.in/nd1_noc20_cy03/preview\)](#)
[Ask a Question \(forum\)](#) [Progress \(student/home\)](#) [Mentor \(student/mentor\)](#)

Unit 5 - Week 3

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

- Lecture 10 :
Crystal Field Theory:
Octahedral vs. Tetrahedral Complex (unit? unit=12&lesson=14)

- Lecture 11 :
Application of CFSE: Spinel and J-T Distortion (unit? unit=12&lesson=15)

- Lecture 12 :
Introduction to Molecular Magnetism (unit? unit=12&lesson=16)

Week 3 : Assignment 3

The due date for submitting this assignment has passed. **Due on 2020-02-19, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Given the molecular formula of the hexa-coordinated complexes **1 point**

- (i) $\text{Co Cl}_3 (\text{NH}_3)_6$
 (ii) $\text{Co Cl}_3 (\text{NH}_3)_5$
 (iii) $\text{Co Cl}_3 (\text{NH}_3)_4$

If the number of coordinated NH_3 molecules in (i), (ii) and (iii) respectively are 6, 5 and 4 then the oxidation state of Co in (i), (ii) and (iii) are respectively

- +6, +5, +4
 +3, +2, +1
 0, +1, +2
 +3, +3, +3

No, the answer is incorrect.
Score: 0

Accepted Answers:
+3, +3, +3

2) Using crystal field theory, identify from the following complex ions that shows same spin only magnetic moment values **1 point**

(A) $[\text{CoF}_6]^{3-}$ (B) $[\text{IrCl}_6]^{3-}$ (C) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$

- A and B
 B and C
 A and C

Lecture 13 :
Problem Solving
Approach (unit?
unit=12&lesson=17)

Lecture 14 :
Magnetism
(unit?
unit=12&lesson=18)

Download
Videos (unit?
unit=12&lesson=62)

Weekly
Feedback (unit?
unit=12&lesson=63)

Quiz : Week 3 :
Assignment 3
(assessment?
name=66)

Week 4

Text Transcripts

A, B and C

No, the answer is incorrect.
Score: 0

Accepted Answers:
A and C

3) The magnetic moment of an octahedral Co(II) complex is 4.0 BM. The electronic configuration of the complex is

1 point

$t_{2g}^5 e_g^2$

$t_{2g}^6 e_g^1$

$t_{2g}^3 e_g^4$

$t_{2g}^4 e_g^3$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $t_{2g}^5 e_g^2$

4) The crystal field stabilization energy (CFSE), in units of Δ_0 for $[\text{CoF}_3(\text{H}_2\text{O})_3]$ is

1 point

0

0.4

0.8

1.8

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.4

5) Which one of the following complexes is Jahn-Teller distorted

1 point

$[\text{Co}(\text{NH}_3)_6]^{+3}$

$[\text{Cr}(\text{H}_2\text{O})_6]^{+3}$

$[\text{Cu}(\text{H}_2\text{O})_6]^{+2}$

$[\text{Fe}(\text{CN})_6]^{-4}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $[\text{Cu}(\text{H}_2\text{O})_6]^{+2}$

6) Consider the two complexes (A) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ and (B) $[\text{Ni}(\text{NH}_3)_6]^{2+}$, the right statement is

1 point

Complex (A) is diamagnetic and complex (B) is paramagnetic

Complex (B) is diamagnetic and complex (A) is paramagnetic

Both are paramagnetic

Both are diamagnetic

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both are paramagnetic

7) The correct spinel structure of Co_3O_4 is

1 point

$[\text{Co}^{2+}]_t [\text{2Co}^{3+}]_o \text{O}_4$

$[\text{Co}^{2+}]_t [\text{2Co}^{3+} \text{Co}^{3+}]_o \text{O}_4$

- $[\text{Co}^{2+} \text{Co}^{3+}]_t [\text{Co}^{3+}]_o \text{O}_4$
 $[2\text{Co}^{3+}]_t [\text{Co}^{2+}]_o \text{O}_4$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$[\text{Co}^{2+}]_t [2\text{Co}^{3+}]_o \text{O}_4$

8) The correct set of electronic configurations for metal ions in octahedral coordination geometry for strong Jahn-Teller distortion is **1 point**

- $t_{2g}^6 e_g^1, t_{2g}^3 e_g^1, t_{2g}^6 e_g^3$
 $t_{2g}^1, t_{2g}^3 e_g^2, t_{2g}^6 e_g^1$
 $t_{2g}^3, t_{2g}^3 e_g^1, t_{2g}^3 e_g^2$
 $t_{2g}^3 e_g^2, t_{2g}^6 e_g^2, t_{2g}^6 e_g^3$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$t_{2g}^6 e_g^1, t_{2g}^3 e_g^1, t_{2g}^6 e_g^3$

9) The spin-only magnetic moment of $[\text{MnF}_6]^{3-}$ is **1 point**

- 3.2 BM
 4.0 BM
 4.9 BM
 5.5 BM

No, the answer is incorrect.

Score: 0

Accepted Answers:

4.9 BM

10) The complex that shows orbital contribution to the magnetic moment is **1 point**

- $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$
 $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$
 $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$
 $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$[\text{Co}(\text{H}_2\text{O})_6]^{2+}$

