

TEST SERIES NET Dec. 2018

PAPER CODE 01

BOOKLET CODE A

Time 3 Hour

M.M. 150

Chemical Science

Date 10/11/2018

Read The Following Instructions Carefully

1. This test booklet contains 50 (25 part B + 25 part C) multiple choice question (MCQs). All question is compulsory
2. Each question in B carries 2 marks and part C question carry 4 marks each respectively
3. Read the question carefully and mark your appropriate response to the OMR sheet.
4. There is negative marking of 1/4 for each wrong answer
- 5 Mark the response by Black Ball pen only.
6. Any other belongings like book/ Notes / Electronic device etc are not permitted in the examination hall.
7. Submit your answer sheet (OMR sheet) to the invigilator before leaving the examination hall and carry the question paper booklet after completion of exam.

ALCHEMIST SCIENCE ACADEMY

CSIR-UGC-NET/JRF|GATE CHEMISTRY

Head Office: 28-/A, Jia Sarai, Hauz Khas, New Delhi -16

Ph. 011-26511021, 8285787633, 9582285416, 9953942156

Website: www.csirnetalchemist.com

E-mail: alchemistscienceacademy@gamil.com

Alchemist Science Academy

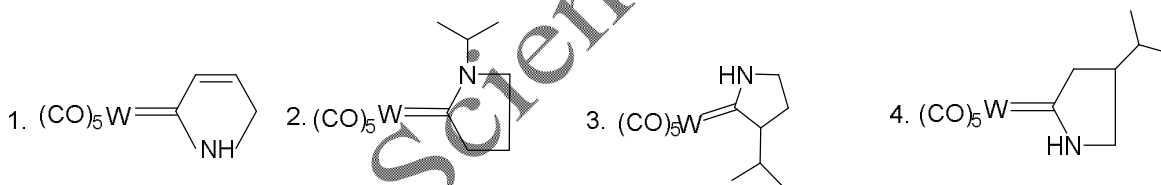
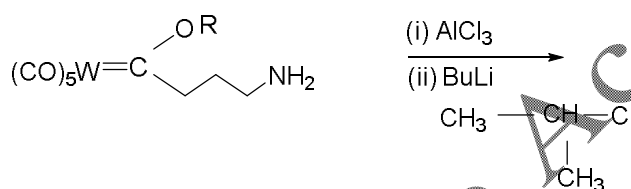
Part – B

- Q1. $KFe[Fe(CN)_6]$ shows intense blue colour due to
 1. d - d transition 2. MLCT 3. LMCT 4. Metal to Metal charge transfer spectra

- Q2. Find out the same value of spin only angular momentum (m spin)

1. $[Fe(CN)_6]^{-4}$, $[Co(NH_3)_6]^{+2}$ 2. $[NiF_6]^{-2}$, $[CoF_6]^{3-}$
 3. $[RhF_6]^{3-}$, $[Ru(H_2O)]^{+2}$ 4. $[Co(H_2O)]^{3+}$, $[Cr(CN)_6]^{3-}$

- Q3. Find the major Product



- Q4. The number of microstate of T_{2g} is

1. 6 2. 16 3. 86 4. 32

- Q5. Hybridisation of PCl_5 in solid state

1. SP^3d 2. SP^3 and SP^3d^3 3. SP^3 and SP^3d^2 4. SP^2 and SP^3

- Q6. Arrange the decreasing orders of average bond energies

1. $F-F > Cl-Cl > Br-Br > I-I$ 2. $F-F < Cl-Cl < Br-Br < I-I$
 3. $I-I < F-F < Br-Br < Cl-Cl$ 4. $I-I < Br-Br < F-F < Cl-Cl$

- Q7. Strongest Hydrogen bond present in

1. HF 2. KHF_2 3. H_2O 4. NH_3

- Q8. Find out the bond order in $[Mo_2(SO_4)_4]^{3-}$

1. 3 2. 2.5 3. 4 4. 3.5

- Q9. According to VBT which of the following species will not exist
 1. Br_3^- 2. I_3^- 3. F_3^- 4. Cl_3^-
- Q10. Assuming there is NO SP mixing what will be the magnetic behavior of B_2 and C_2 respectively
 1. paramagnetic, diamagnetic 2. Diamagnetic, paramagnetic
 3. Both Diamagnetic 4. Both paramagnetic
- Q11. Boric Acid H_3BO_3 is
 1. Tribasic 2. Monobasic and n factor is 3
 3. Dibasic 4. Monobasic and n factor is one
- Q12. Which of the following obey 18 electron rule:
 1. $(n^7\text{-C}_7\text{H}_7)\text{Co}(\text{CO})_3$ 2. $(n^5\text{cp}^*)\text{Re}(=\text{O})_4$ 3. $\text{RhCl}(\text{PPh}_3)_3$ 4. $\text{MnCl}(\text{CO})_5$
- Q13. Arrange the compounds increasing order of molar Absorbance (ϵ)
 (i) MnO_4^- (ii) $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ (iii) $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ (iv) $[\text{CoCl}_4]^{2-}$
 1. $i > ii > iii > iv$ 2. $i > iv > iii > ii$ 3. $i > iv > ii > iii$ 4. $ii > i > iii > iv$
- Q14. Interpretation of electronic Absorption spectra use of Racah parameters, the energy is Given below in identify the incorrect option
 1. ${}^3\text{P} = \text{A} + 7\text{B}$ 2. ${}^1\text{S} = \text{A} - 14\text{B} + 7\text{C}$ 3. ${}^3\text{F} = \text{A} - 8\text{B}$ 4. ${}^1\text{D} = \text{A} - 3\text{B} + 2\text{C}$
- Q15. Find out the M–M bond in $\text{Mo}_2(\text{S}_2)_6^{2-}$ and $\text{Cr}_2\text{Cl}_9^{3-}$ respectively
 1. Two, Two 2. Zero, zero 3. Zero, One 4. Two, zero
- Q16. For the reaction $[\text{Ru}(\text{NH}_3)_6]^{2+} + [\text{Co}(\text{Phen})_3]^{3+} \rightarrow [\text{Ru}(\text{NH}_3)_6]^{3+} + [\text{Co}(\text{Phen})_3]^{2+}$
 The equilibrium constant is 2.6×10^5
 The rate constant for the self exchange reaction $[\text{Ru}(\text{NH}_3)_6]^{2+} / [\text{Ru}(\text{NH}_3)_6]^{3+}$ and $[\text{Co}(\text{Phen})_3]^{2+} / [\text{Co}(\text{Phen})_3]^{3+}$ are 8.2×10^2 and $40 \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ respectively. Find out the Rate constant approximately.
 1. $9.2 \times 10^4 \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ 2. $6.2 \times 10^4 \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$
 3. $2 \times 10^{12} \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ 4. $11.2 \times 10^4 \text{ dm}^4 \text{ mol}^{-1} \text{ s}^{-1}$
- Q17. Which of the following statements is true:
 1. Bonding occurs when the LCAO of two AO generated two MO that are both of lower energy than AO.
 2. A bond order of zero means that only Antibonding orbitals are generate by LCAO
 3. A bond order of one means that constructive interference has generate one bonding MO
 4. S orbitals are cylindrically symmetric

- Q18. Match the value of Nuclear spin Quantum number
- | | |
|---------------------|--------|
| 1. D | P. 3/2 |
| 2. ^{51}V | Q. 5/2 |
| 3. ^{127}I | R. 1 |
| 4. ^{61}Ni | S. 7/2 |
1. 1R, 2S, 3Q, 4P 2. 1S, 2Q, 3P, 4R 3. 1R, 2Q, 3S, 4P 4. 1R, 2P, 3S, 4Q
- Q19. The crystal field splitting energy (Δ_0) for CoCl_6^{4-} is 27000 cm^{-1} . The Δ_0 CoCl_4^{2-} would be
1. 1.143 KJmol^{-1} 2. 12000 cm^{-1} 3. $16,000\text{ cm}^{-1}$ 4. 1 and 2 both
- Q20. Precursor of Mossbauer spectroscopy is
1. ^{57}Fe 2. ^{119}Sn ^{57}Co 3. ^{57}Fe ^{119}Sn 4. ^{57}Co ^{57}Fe
- Q21. In the following reaction of Hemoglobin equilibrium constant increasing order is
- $$\text{Hb} + \text{O}_2 \xrightleftharpoons{k_1} \text{HbO}_2$$
- $$\text{HbO}_2 + \text{O}_2 \xrightleftharpoons{k_2} \text{Hb}(\text{O}_2)_2$$
- $$\text{Hb}(\text{O}_2)_2 + \text{O}_2 \xrightleftharpoons{k_3} \text{Hb}(\text{O}_2)_3$$
- $$\text{Hb}(\text{O}_2)_3 + \text{O}_2 \xrightleftharpoons{k_4} \text{Hb}(\text{O}_2)_4$$
1. $k_4 > k_3 > k_2 > k_1$ 2. $k_1 > k_2 > k_4 > k_3$
 3. $k_2 > k_3 > k_4 > k_1$ 4. $k_1 > k_2 > k_3 > k_4$
- Q22. Find out the ground term symbol in d^4 (Low spin) Configuration octahedral field.
1. ^3H 2. ^3F 3. ^3P 4. ^3D
- Q23. KHF_2 exist but CsHF_2 Not exist why?
1. Due to absence of H bonding 2. Orbital contraction is not possible
 3. HF_2^- is not form in CsHF_2 4. 1 and 3
- Q24. Match the correct option of CFSE for lowest orbital energy is
- | | |
|-------------------------|-----------------------|
| 1. Square pyramidal | P. dxz, dyz |
| 2. Tetrahedral | Q. All degenerate |
| 3. Square Antiprismatic | R. $dx^2 - y^2, dz^2$ |
| 4. Icosahedron | S. dz^2 |
1. 1.P 2.R 3.Q 4.S 2 1.P 2.R 3.S 4.Q
 3. 1.P 2.S 3.R 4.Q 4 1.R 2.Q 3.S 4.P
- Q25. Oxidation state of Ag in $[\text{AgTe}_7]^{3-}$ is
1. II 2. I 3. III 4. V

Part – C

Q26. Find the correct order of Bond strength of hydrogen bonding in given compounds

(P) F-H.....F-H (Q) F-H.....O-H (R) F-H.....N-H

1. P > R > Q 2. P > Q > R 3. R > Q > P 4. R > P > Q

Q27. Match the following option

1. Transportation of iron P. Transfer of electrons in Biological system

2. Storage of iron Q. Vit B₁₂ enzyme

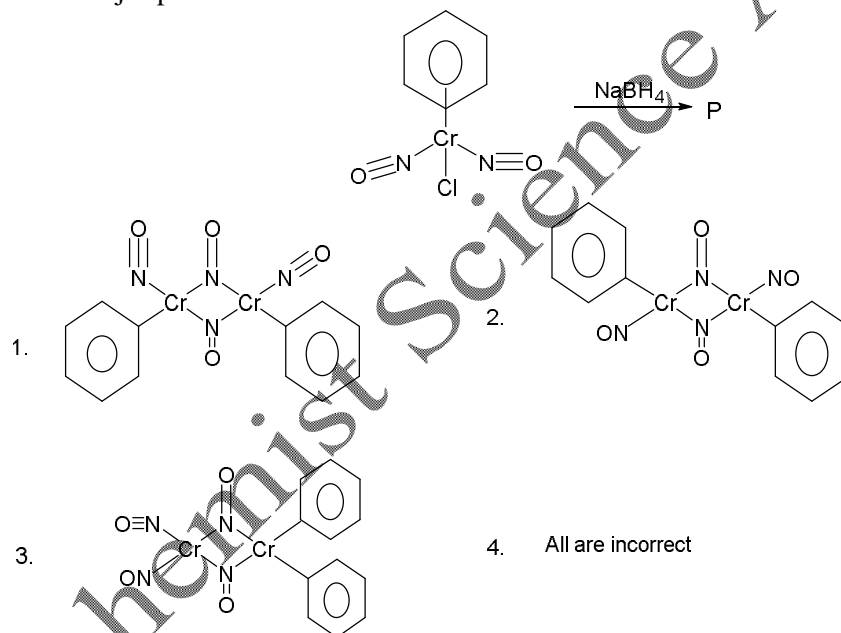
3. RNA Converted into DNA R. Sidophore and transferrin

4. Blue copper protein S. Ferritine protein

1. 1 R, 2 Q, 3 S, 4 P 2. 1 S, 2 P, 3, Q 4, R

3. 1 R, 2 S, 3 Q, 4 P 4. 1 R, 2 S, 3 P, 4 Q

Q28. Find the major product



Q29. PbO₂, Tl₂O₃, Bi₂O₅ are strong oxidizing agent due to

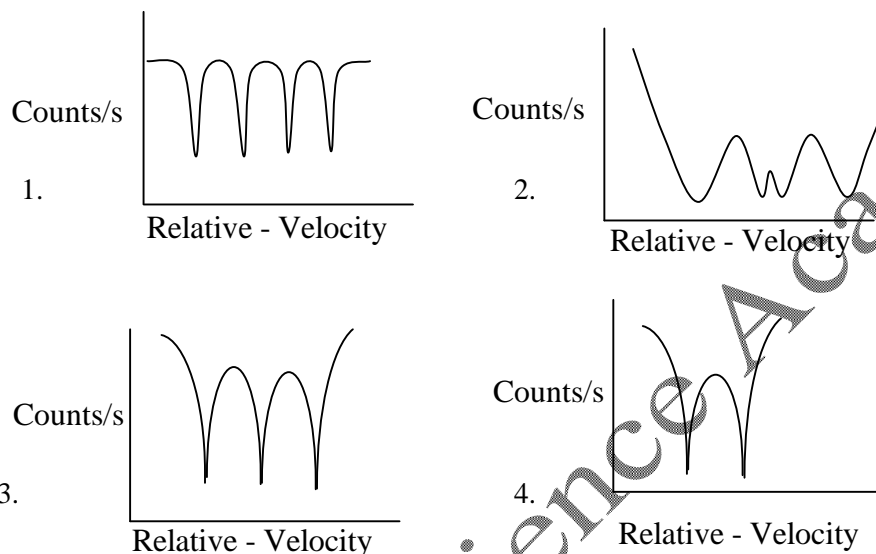
1. Inert pair effect 2. Internal excitation is not possible in these metal ion, atoms
3. None of these 4. 1 and 2

Q30. Find the decreasing orders of acidic strength in given compound is

PPh₃(CO)₃Mn-H PF₃(CO)₃Mn-H (CO)₄Mn-H
(i) (ii) (iii)

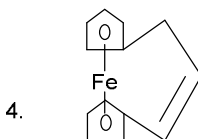
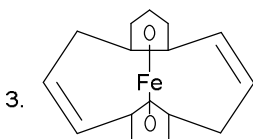
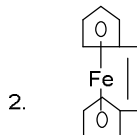
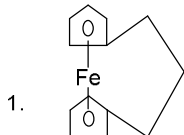
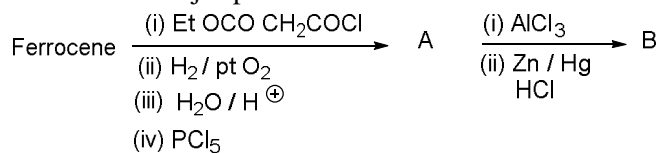
1. (i) > (ii) > (iii) 2. (iii) > (i) > (ii) 3. (i) > (iii) > (ii) 4. (iii) > (ii) > (i)

- Q31. Find the STYX code of B_2H_6 and B_4H_{10} is
 1. 2002,4112 2. 2002,4012 3. 2102,4012 4. 2202,4021
- Q32. Find out the bonding molecular orbitals in $Rh_6(CO)_{16}$ and $[Os_5(C)(CO)_{15}]$ respectively
 1. 43 and 37 2. 32 and 37 3. 43 and 32 4. 34 and 37
- Q33. Probable Mossbauer spectrum of $Fe_3(Co)_{12}$ is

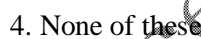
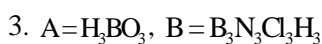
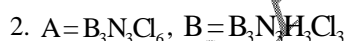
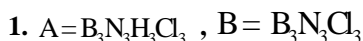


- Q34. Find the correct option is
 1. H_3PO_3 is more acidic than H_3PO_4
 2. $N_2 + 8H^+ + 8e^- + 16ATP \rightarrow 2NH_3 + H_2 + 16ADP + 16HPO_4^{2-}$
 3. Ground state term symbol of Gd^{+3} is $^8S_{3/2}$
 4. All option is correct
- Q35. Find the strongest band'' transition is
 1. $^3\Sigma_g^+ \rightarrow \Sigma_u^-$ 2. $^1\Sigma_g^+ \rightarrow ^2\Sigma_g^+$ 3. $^3\Sigma_g^- \rightarrow ^1\Sigma_g^+$ 4. $^3\Sigma_g^- \rightarrow ^3\Sigma_u^-$
- Q36. Identify the first Row transition Metal for the following 18 electron species
 (A) $[M(CO)_3(PPh_3)]^-$ (B) $HM(CO)_5$ (C) $h^4 - C_8H_8M(CO)_3$
 1. Co, Mn, Ni 2. Co, Ni, Mn 3. Co, Mn, Fe 4. Cr, Mn, Fe
- Q37. Classify the following main group cluster
 Pb_5^{2-} Sb_4^{2-} Ge_9^{2-}
 (A) (B) (C)
 1. Closo, Arachno, Closo 2. Closo, Closo, Nido
 3. Nido, Nido, Arachno 4. Closo, Nido, Nido

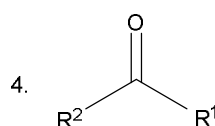
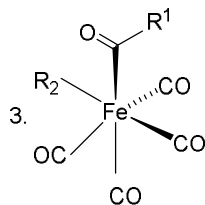
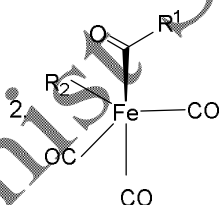
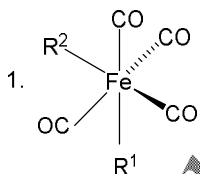
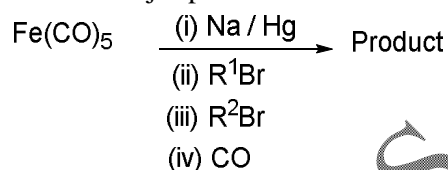
Q38. Find out the major product **B** is



Q39. Find out the A and B $3\text{BCl}_3 + 3\text{NH}_4\text{Cl} \xrightarrow{140^\circ\text{C}} \text{A} \xrightarrow{\text{NaBH}_4} \text{B}$



Q40. Find the major product



Q41. Given that the CFSE for $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ is 7200 cm^{-1} . Calculate the value of Δ_0 approximately is

1. 9000 cm^{-1}

2. 107 KJ mol^{-1}

3. $25 \text{ K cal mol}^{-1}$

4. All is

correct

Q42. In porphyrine Ring find out the huckel No. and pyrole ring is respectively.

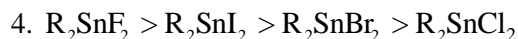
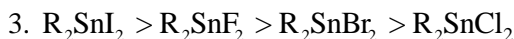
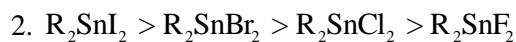
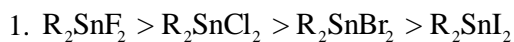
1. 5, 4

2. 4, 5

3. 4, 4

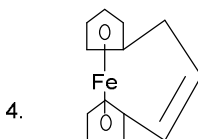
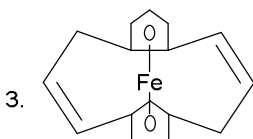
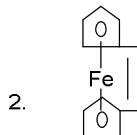
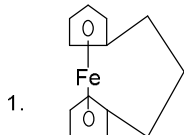
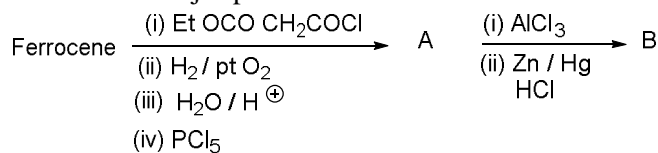
4. 5, 5

Q43. Find out the order of isomer shift is

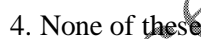
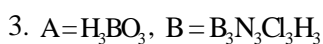
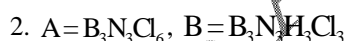
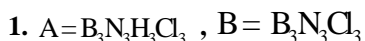


- Q44. Correct orders of nephelauxetic effect of metal ions (Independent of ligands)
1. $\text{Ir(III)} > \text{Co(III)} > \text{Mn(IV)} > \text{Fe(III)}$
 2. $\text{Fe(III)} < \text{Ir(III)} < \text{Co(III)} < \text{Mn(IV)}$
 3. $\text{Mn(II)} < \text{Ni(II)} \approx \text{Co(II)} < \text{Mo(II)}$
 4. 2 and 3 both
- Q45. Diccopper tetraacetate dehydrate $\text{Cu}_2(\text{CH}_3\text{COO})_4 \cdot 2\text{H}_2\text{O}$ shows the magnetic moment at room temperature 1.4 Bm which increases with temperature due to
1. Antiferromagnetic Coupling
 2. Ferromagnetic Coupling
 3. diamagnetic Coupling
 4. None of these
- Q46. Arrange the increasing IR frequency in CO complex
1. $\text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3\text{py}_3 < \text{Cr(CO)}_3(\text{Cs})_3$
 2. $\text{Cr(CO)}_3(\text{py})_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3(\text{CS})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3$
 3. $\text{Cr(CO)}_3(\text{Py})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_3(\text{CS})_3 < \text{Cr(CO)}_6$
 4. $\text{Cr(CO)}_3(\text{Py})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3(\text{Cs})_3$
- Q47. MgAl_2O_4 and $\text{Fe}[\text{NiFe}]\text{O}_4$ are respectively
1. Normal spinels both
 2. Inverse spinels both
 3. Normal spinel, Inverse
 4. Inverse and Normal spinels
- Q48. Find out the incorrect component in octahedral field.
1. $\text{I} = 2\text{T}_{2g} + 2\text{A}_{2g} + \text{E}_g + \text{T}_{1g}$
 2. $\text{H} = \text{E}_g + 2\text{T}_{1g} + \text{T}_{2g}$
 3. $\text{G} = \text{A}_{1g} + \text{E}_g + \text{T}_{2g} + \text{T}_{1g}$
 4. $\text{D} = \text{T}_{2g} + \text{E}_g$
- Q49. Match the colour of elements
- | | |
|------------------------|----------------|
| (I) Nd^{3+} | (a) Lilac |
| (II) Er^{+3} | (b) Colourless |
| (III) Ce^{3+} | (c) Rose pink |
| (IV) Ho^{3+} | (d) Yellow |
1. I(a); II(b); III(c); IV(d)
 2. I(b); II(d); III(c); IV(a)
 3. I(a); II(c); III(b); IV(d)
 4. I(a); II(c); III(d); IV(b)
- Q50. Agostic interaction is
1. $3\text{C} - 2\text{e}^-$ Bonding
 2. Intramolecular attraction
 3. Only shows transition metal
 4. All above

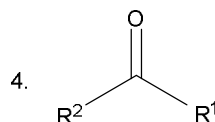
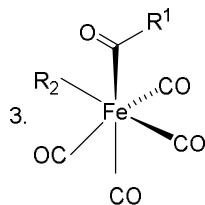
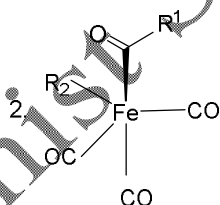
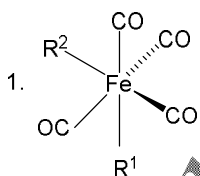
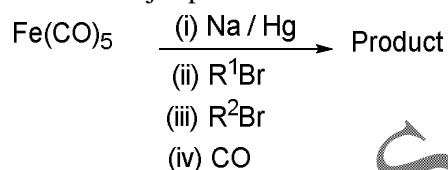
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Q40. Find the major product



Q41. Given that the CFSE for $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ is 7200 cm^{-1} . Calculate the value of Δ_0 approximately is

1. 9000 cm^{-1}

2. 107 KJ mol^{-1}

3. $25 \text{ K cal mol}^{-1}$

4. All is

correct

Q42. In porphyrine Ring find out the huckel No. and pyrole ring is respectively.

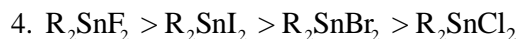
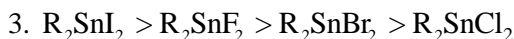
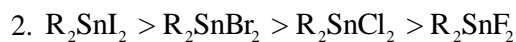
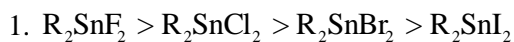
1. 5, 4

2. 4, 5

3. 4, 4

4. 5, 5

Q43. Find out the order of isomer shift is



- Q44. Correct orders of nephelauxetic effect of metal ions (Independent of ligands)
1. $\text{Ir(III)} > \text{Co(III)} > \text{Mn(IV)} > \text{Fe(III)}$
 2. $\text{Fe(III)} < \text{Ir(III)} < \text{Co(III)} < \text{Mn(IV)}$
 3. $\text{Mn(II)} < \text{Ni(II)} \approx \text{Co(II)} < \text{Mo(II)}$
 4. 2 and 3 both
- Q45. Diccopper tetraacetate dehydrate $\text{Cu}_2(\text{CH}_3\text{COO})_4 \cdot 2\text{H}_2\text{O}$ shows the magnetic moment at room temperature 1.4 Bm which increases with temperature due to
1. Antiferromagnetic Coupling
 2. Ferromagnetic Coupling
 3. diamagnetic Coupling
 4. None of these
- Q46. Arrange the increasing IR frequency in CO complex
1. $\text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3\text{py}_3 < \text{Cr(CO)}_3(\text{Cs})_3$
 2. $\text{Cr(CO)}_3(\text{py})_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3(\text{CS})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3$
 3. $\text{Cr(CO)}_3(\text{Py})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_3(\text{CS})_3 < \text{Cr(CO)}_6$
 4. $\text{Cr(CO)}_3(\text{Py})_3 < \text{Cr(CO)}_3(\text{PF}_3)_3 < \text{Cr(CO)}_6 < \text{Cr(CO)}_3(\text{Cs})_3$
- Q47. MgAl_2O_4 and $\text{Fe}[\text{NiFe}]\text{O}_4$ are respectively
1. Normal spinels both
 2. Inverse spinels both
 3. Normal spinel, Inverse
 4. Inverse and Normal spinels
- Q48. Find out the incorrect component in octahedral field.
1. $\text{I} = 2\text{T}_{2g} + 2\text{A}_{2g} + \text{E}_g + \text{T}_{1g}$
 2. $\text{H} = \text{E}_g + 2\text{T}_{1g} + \text{T}_{2g}$
 3. $\text{G} = \text{A}_{1g} + \text{E}_g + \text{T}_{2g} + \text{T}_{1g}$
 4. $\text{D} = \text{T}_{2g} + \text{E}_g$
- Q49. Match the colour of elements
- | | |
|------------------------|----------------|
| (I) Nd^{3+} | (a) Lilac |
| (II) Er^{+3} | (b) Colourless |
| (III) Ce^{3+} | (c) Rose pink |
| (IV) Ho^{3+} | (d) Yellow |
1. I(a); II(b); III(c); IV(d)
 2. I(b); II(d); III(c); IV(a)
 3. I(a); II(c); III(b); IV(d)
 4. I(a); II(c); III(d); IV(b)
- Q50. Agostic interaction is
1. $3\text{C} - 2\text{e}^-$ Bonding
 2. Intramolecular attraction
 3. Only shows transition metal
 4. All above

Test Series Part Test 01

Answer Key

Date 10/11/2018

1.(4)	2.(3)	3.(3)	4.(1)	5.(3)	6.(3)
7.(2)	8.(4)	9.(3)	10.(2)	11.(4)	12.(4)
13.(2)	14.(2)	15.(2)	16.(1)	17.(4)	18.(1)
19.(4)	20.(2)	21.(1)	22.(1)	23.(4)	24.(2)
25.(2)	26.(3)	27.(3)	28.(2)	29.(4)	30.(4)
31.(2)	32.(1)	33.(2)	34.(4)	35.(4)	36.(3)
37.(1)	38.(1)	39.(4)	40.(4)	41.(4)	42.(3)
43.(2)	44.(4)	45.(1)	46.(4)	47.(3)	48.(1)
49. (3)	50. (4)				

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Organic Chemistry	12/11/2018	19/11/2018	26/11/2018
Physical Chemistry	14/11/2018	21/11/2018	28/11/2018

Full Length Test

01/12/2018	5/12/2018	10/12/2018
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