

TEST SERIES NET Dec. 2018

PAPER CODE 04

BOOKLET CODE B

Time 3 Hour

M.M. 150

Chemical Science

Date 17/11/2018

Read The Following Instructions Carefully

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

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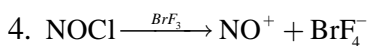
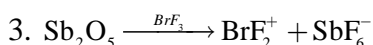
Part B

Q1. Match the following is correct

Hybridization	Atomic Orbitals
(A) d^2sp^3	(i) $d_{x^2-y^2} + S + Px + Py$
(B) dsp^3 (TBP)	(ii) $dz^2 + S + P$ orbitals
(C) dsp^3 (SP)	(iii) $d_{x^2-y^2} + S + P$ orbitals
(D) dsp^2	(iv) $d_{x^2-y^2} + S + dz^2 + P$ orbitals

- | | |
|-------------------------------|-------------------------------|
| 1. A(i), B(iv), C(ii), D(iii) | 2. A(iv), B(ii), C(iii), D(i) |
| 3. A(iv), B(iii), C(ii), D(i) | 4. A(i), B(ii), C(iii), D(iv) |

Q2. Find out the incorrect reaction



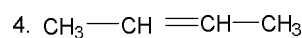
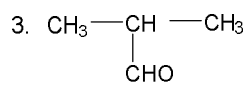
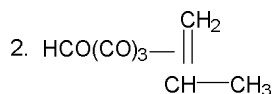
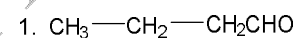
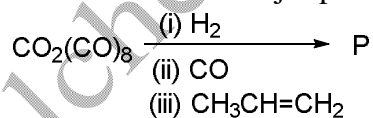
Q3. Number of micro state in excited state of Ti .

- | | | | |
|-------|-------|-------|-------|
| 1. 15 | 2. 20 | 3. 17 | 4. 21 |
|-------|-------|-------|-------|

Q4. Possible term symbols of d^2 electronic configuration in their increasing order of energy.

- | | |
|----------------------------------|----------------------------------|
| 1. $^1S < ^3P < ^1G < ^3F < ^1D$ | 2. $^3F < ^3P < ^1G < ^1D < ^1S$ |
| 3. $^3P < ^3G < ^3F < ^1S$ | 4. $^1F < ^1G < ^3P < ^1S < ^1D$ |

Q5. Find out the final major product of this reaction



- Q6. Find out the correct order of wavelength in charge in transfer spectra
1. $\text{HgCl}_2 > \text{HgBr}_2 > \text{HgI}_2$
 2. $\text{HgI}_2 > \text{HgBr}_2 > \text{HgCl}_2$
 3. $\text{VO}_4^{3-} > \text{CrO}_4^{2-} > \text{MnO}_4^-$
 4. 2 and 3 both are correct
- Q7. Find the LFSE for a d^6 ion for both high spin low spin respectively
1. $-2/5\Delta_0, -12/5\Delta_0$
 2. $-4/5\Delta_0, -12/5\Delta_0$
 3. $-2/5\Delta_0, -4/5\Delta_0$
 4. $-12/5\Delta_0, -2/5\Delta_0$
- Q8. Arrange the following increasing order of tendency to form complex:
- $\text{Y}^{3+}, \text{La}^{3+}, \text{Ac}^{3+}, \text{Sc}^{3+}$
1. $\text{Y}^{3+} > \text{La}^{3+} > \text{Ac}^{3+} > \text{Sc}^{3+}$
 2. $\text{Y}^{3+} < \text{La}^{3+} < \text{Ac}^{3+} < \text{Sc}^{3+}$
 3. $\text{Sc}^{3+} > \text{Y}^{3+} > \text{La}^{3+} > \text{Ac}^{3+}$
 4. $\text{Sc}^{3+} < \text{Y}^{3+} < \text{La}^{3+} < \text{Ac}^{3+}$
- Q9. A compound $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ Absorb 500nm wavelength E.M.R. Find out the CFSE.
1. -9568Jmol^{-1}
 2. -800cm^{-1}
 3. -81.30cm^{-1}
 4. 1 and 2 Both
- Q10. Inter electronic repulsion in a free Metal ion is 918cm^{-1} and inter electronic repulsion parameter in a complex is 827cm^{-1} . Find the % ionic character approximately is
1. 10%
 2. 20%
 3. 80%
 4. 90%
- Q11. What is the correct formula in which of the following
1. $15B' = \nu_2 + \nu_3 - 3\nu_1$
 2. $15B' = 2\nu_3 + \nu_1 - 3\nu_1$
 3. $15B = \nu_2 + \nu_3 - 3\nu_1$
 4. $15B' = \nu_2 + \nu_1 - 3\nu_3$
- Q12. Mg^{2+} Preferred in photo synthesis by chlorophyll because
1. It has strong spin orbit coupling
 2. It has weak spin orbit coupling
 3. It is a heavy metal
 4. It binds strongly with chlorophyll.
- Q13. Find out the incorrect option
1. In carbonic anhydrase enzyme Zn metal Accelerate the acidity of H_2O
 2. CH_2 is isolable with $\text{Cu}(h^5 - \text{C}_5\text{Me}_5)$
 3. Acidity of XeO_3F_2 is less than XeF_6
 4. In nitrogenase component Zn metal is present

- Q14. Correct comments about $[\text{Co}(\text{OH}_2)_6]^{2+}$ and $[\text{Mn}(\text{OH}_2)_6]^{2+}$ transition in
1. $[\text{Mn}(\text{OH}_2)_6]^{2+}$ Spin forbidden and Laporte Allowed
 2. Transition in $[\text{Co}(\text{OH}_2)_6]^{2+}$ spin allowed and Laporte allowed
 3. Transition $[\text{Mn}(\text{OH}_2)_6]^{2+}$ is spin forbidden and $[\text{Co}(\text{OH}_2)_6]^{2+}$ is spin allowed but both Laporte forbidden.
 4. Both transition Laporte allowed and spin allowed
- Q15. Find the correct structure of $[\text{Re}_4(\text{CO})_{16}]^{2-}$ is
1. Square pyramidal
 2. Cupped octahedron
 3. Cupped square pyramidal
 4. Butterfly
- Q16. Find the correct intensity ratio of the CD_3 radical in its ESR spectrum
1. 1:3:6:7:6:3:1
 2. 1:6:15:20:15:6:1
 3. 1:4:5:7:5:4:1
 4. 1:2:3:7:3:2:1
- Q17. In the EPR spectrum of tetragonal Cu - complex, when $g_{\parallel} > g_{\perp} > g_e$, the unpaired e^- will be in the orbital
1. dxy
 2. $x^2 - y^2$
 3. dz^2
 4. dxz
- Q18. Find out the kinetically labile complex
- P. $[\text{V}(\text{NH}_3)_6]^{3+}$ Q. $[\text{Co}(\text{CN})_6]^{3-}$ R. $[\text{MnCl}_6]^{3-}$ S. $[\text{Cr}(\text{CN})_6]^{3-}$
1. P,Q
 2. R,S
 3. S,Q
 4. P,S
- Q19. The infra-red stretching frequency ν_{CO} of P-S follows the order
- (P) $\text{Mn}(\text{CO})_6^+$ (Q) CO (R) $\text{H}_3\text{B} \leftarrow \text{CO}$ (S) $[\text{V}(\text{CO})_6]^-$
1. $\text{P} > \text{R} > \text{S} > \text{Q}$
 2. $\text{S} > \text{P} > \text{R} > \text{Q}$
 3. $\text{Q} > \text{S} > \text{P} > \text{R}$
 4. $\text{R} > \text{Q} > \text{P} > \text{S}$
- Q20. Arrange the following species in their increasing order of isomer shift the correct option
1. $\text{FeI}_2 > \text{FeCl}_2 < \text{FeBr}_2 < \text{FeF}_2$
 2. $\text{FeI}_2 < \text{FeBr}_2 < \text{FeCl}_2 < \text{FeF}_2$
 3. $\text{FeF}_2 < \text{FeCl}_2 < \text{FeBr}_2 < \text{FeI}_2$
 4. $\text{FeI}_2 > \text{FeBr}_2 < \text{FeF}_2 < \text{FeCl}_2$
- Q21. Find classification of $\text{B}_4\text{H}_6(\text{CoCP})_2$
1. Nido
 2. Closo
 3. Arachno
 4. Hyper Closo

- Q22. In benzene radical anion of 7 ESR line is observe with hyperfine splitting constant of 90mT calculate the % e^- charge density of each hydrogen.
1. 6%
 2. 12%
 3. 3.3%
 4. 9%
- Q23. The strongest reducing ion of the following is
1. Cm^{3+}
 2. U^{3+}
 3. Am^{3+}
 4. Cf^{3+}
- Q24. Choose the correct statements
1. inoxy myoglobin Fe has small size than deoxy myoglobin.
 2. Binding power of myoglobin is high than Hemoglobin
 3. Hemocyanine and Hemerytrin used in transportation of O_2 in marine vertebrates
 4. All are correct.
- Q25. Find the product of the following reaction
- $$\text{B}_4\text{H}_{10} + 2\text{Me}_3\text{N} \rightarrow ?$$
1. $\text{Me}_3\text{NB}_3\text{H}_7$ and Me_3NBH_6
 2. $\text{Me}_3\text{NB}_3\text{H}_4$ And B_2H_6
 3. $[(\text{Me}_3\text{N})_2\text{BH}_2]^+$ and $[\text{B}_3\text{H}_8]^-$
 4. $[\text{B}(\text{OH})_4]^-$ And $[\text{B}_3\text{H}_8]$

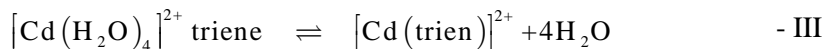
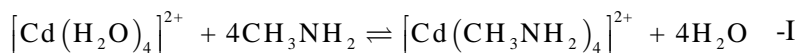
Part C

- Q26. Which of the following is NOT suitable as catalyst for hydroformylation?
 1. $\text{HCo}(\text{CO})_4$ 2. $\text{HCo}(\text{CO})_3\text{PBu}_3$ 3. $\text{HRh}(\text{CO})(\text{PPh}_3)_3$ 4. $\text{H}_2\text{Rh}(\text{PPh}_3)_2\text{Cl}$
- Q27. Ferredoxin Iron sulphur protein Fe_3S_4 present Non labile Sulphur and number of unpaired electrons in reductive state respectively.
 1. 4, 2 2. 3, 2 3. 3, 5 4. 3, 4
- Q28. Arrange the all possible term symbols of O_2 in their increasing order of energy
 1. $^1\sum_g^+ < ^1p_g < ^3\sum_g^-$ 2. $^3\sum_g^- < ^1\Delta_g < ^1\sum_g^+$
 3. $^1\sum_g^+ < ^1\Delta_g < ^3\sum_g^-$ 4. $^1\Delta_g < ^1\sum_g^+ < ^3\sum_g^-$
- Q29. The ratio of relative intensities of the two molecular ion peaks of methyl bromide (CH_3Br) in the mass spectrum is
 1. $M^+ : (M+2)^+ = 1:1$ 2. $M^+ : (M+2)^+ = 3:1$
 3. $M^+ : (M+2) = 1.3$ 4. $M^+ : (M+2)^+ = 1:2$
- Q30. Find the ESR lines of $\text{Co}_3(\text{Co})_9\text{Se}$ complex (I value for Co = $7/2$)
 1. 22 2. 21 3. 25 4. 30
- Q31. Find out the respectively nodal plane in in $dx^2 - y^2$ and dz^2
 1. 2, 2 2. 2, 0 3. 2, 1 4. 1, 2
- Q32. Find the ground state term symbols of Eu^{3+} and Sm^{3+} respectively.
 1. $^6\text{H}_{5/2}$ and $^7\text{F}_0$ 2. $^7\text{F}_0$ and $^6\text{H}_{5/2}$
 3. $^7\text{H}_{5/2}$ and $^6\text{F}_{5/2}$ 4. $^6\text{H}_{5/2}$ and $^5\text{F}_{7/2}$
- Q33. Require matching of items **Column I** with the appropriate items in **Column II**. Choose the correct one from the alternative 1, 2, 3 and 4.
- | Column – I | Column – II |
|-----------------------------|---|
| P: Wilkinson's catalyst | I. $\text{Trans IrCl}(\text{CO})(\text{PPh}_3)_2$ |
| Q: Speiers's catalyst | II. Hydrosilylation |
| R: Water gas shift catalyst | III. $\text{RhCl}(\text{PPh}_3)_3$ |
| S: Zeolite ZSM-5 catalyst | IV. Synthetic gasoline |
| | V. hydroformylation |

VI. Zinc – copper oxide.

1. P-III, Q-II, R-VI, S-IV 2. P-I, Q-V, R-III, S-IV
3. P-V, Q-II, R-VI, S-IV 4. P-III, Q-VI, R-IV, S-II
- Q34. The correct order of C-O bond length among CO , CO_3^{2-} , CO_2
1. $\text{CO} < \text{CO}_2 < \text{CO}_3^{2-}$ 2. $\text{CO}_2 < \text{CO}_3^{2-} < \text{CO}$
3. $\text{CO} < \text{CO}_3^{2-} < \text{CO}_2$ 4. $\text{CO}_3^{2-} < \text{CO}_2 < \text{CO}$
- Q35. Find out the correct orders of bond length.
1. $\text{NO}^+ < \text{NO} < \text{NO}^{+2} < \text{NO}^-$ 2. $\text{NO}^+ > \text{NO}^{+2} > \text{NO} > \text{NO}^-$
3. $\text{NO}^+ > \text{NO}^{+2} = \text{NO} < \text{NO}^-$ 4. $\text{NO}^+ < \text{NO}^{+2} < \text{NO} < \text{NO}^-$
- Q36. The source (i.e. ^{57}Co) of $^{57}\text{Fe}^*$ is moving at speed of 2 mm s^{-1} . Calculate the frequency shift (g -ray frequency $3.5 \times 10^{18} \text{ Hz}$).
1. 13.3MHz 2. 23.3MHz 3. 2.33MHz 4. 26.3MHz
- Q37. The ^{119}Sn NMR chemical shift (approximately in ppm) corresponding to $(\eta^5\text{-Cp})_2\text{Sn}$ (relative to Me_4Sn) is
1. -40 2. +137 3. +346 4. -2200
- Q38. Cis and Trans of $[\text{PtBrCl}(\text{PR}_3)_2]$ given signal in ^{31}P NMR spectroscopy
1. 1,2 2. 1,1 3. 3,2 4. 2,1
- Q39. $[\text{Ni}(\text{en})_3]^{2+}$ Taking wavelength 315 nm and CFSE (Δ_0) is 11500 cm^{-1} . Calculate the difference between m spinonly and m effective. Taking into account orbit coupling (Given $^3\text{A}_{2g}$ ground state)
1. 0.31 2. 0.42 3. 0.36 4. 1.10
- Q40. Arrange the rate of the outer stereo mechanism of the following
(i) $[\text{Fe}(\text{CN})_6]^{4-} + [\text{Fe}(\text{CN})_6]^{3-} \rightarrow$
(ii) $[\text{Fe}(\text{bpy})_3]^{3+} + [\text{Fe}(\text{bpy})_3]^{2+}$
(iii) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+} + [\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
1. ii > i > iii 2. i > iii > ii 3. i > ii > iii 4. iii > ii > i

Q41. Write the correct comment about these reaction



1. $\Delta S(\text{I}) > \Delta S(\text{II}) > \Delta S(\text{III})$

2. $\Delta S(\text{I}) < \Delta S(\text{II}) < \Delta S(\text{III})$

3. Stability orders of product is $\text{III} > \text{II} > \text{I}$

4. 2 and 3 is correct option

Q42. Find the correct option for the electronic transition

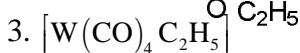
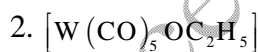
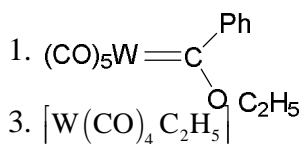
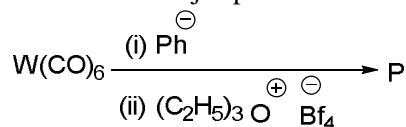
1. $s \leftrightarrow p \leftrightarrow d \leftrightarrow f$

2. $s \leftrightarrow d \leftrightarrow f \leftrightarrow p$

3. $s \leftrightarrow p \leftrightarrow f \leftrightarrow d$

4. $s \leftrightarrow f \leftrightarrow d \leftrightarrow p$

Q43. Find out the major product



Q44. Fisher carbenes are

1. Triplets and nucleophilic

2. Triplets and electrophilic

3. Singlets and nucleophilic

4. Singlets and electrophilic

Q45. The coordination geometry around the Copper ion of plastocyanin in oxidised and reduced form will be respectively

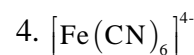
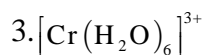
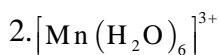
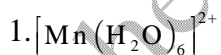
1. Tetrahedral and square planar

2. Distorted tetrahedral for both

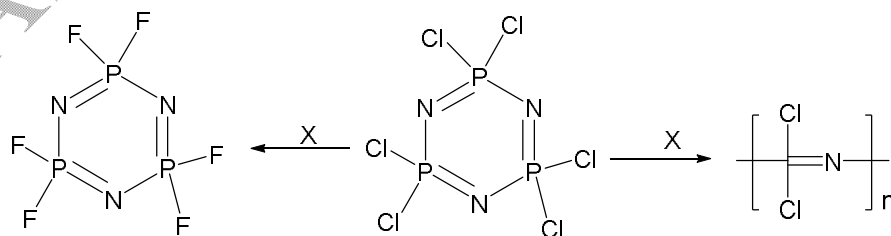
3. Both are ideal tetrahedral

4. Square planar and tetrahedral

Q46. The compound which exhibits John-Teller distortion is:



Q47.



The reagent condition X and Y are

1. $X = \text{BF}_3$, $X = \text{heating at } 1250^\circ\text{C}$

2. $X = \text{NaF}$, $Y = \text{heating at } 250^\circ\text{C}$

3. $X = \text{NH}_4\text{F}$, $X = \text{HCl}$

4. $X = \text{CF}_3\text{SO}_3\text{H}$, $Y = \text{H}_2\text{SO}_4$

Q48. Among the following substituted silane, the one that gives cross-linked silicons polymer upon hydrolysis is

1. $(\text{CH}_3)_4\text{Si}$

2. CH_3SiCl_3

3. $\text{SiCl}_2(\text{CH}_3)$

4. $(\text{CH}_3)_3\text{SiCl}$

Q49. If PH value increase in blood than Binding power of Hemoglobin with oxygen is

1. Increase

2. Decrease

3. First decrease then increase

4. Not effect

Q50. Match the following chemical shift

A. $[\text{Mn}(\text{CO})_5\text{H}]$ 1. -7.5

B. $[\text{W}(\text{CH}_3)_6]$ 2. 3.06

C. $[\text{Ni}(h^2 - \text{C}_2\text{H}_4)_3]$ 3. 1.80

D. $[(h^5\text{cp})_2\text{Fe}]$ 4. 4.04

E. $[(h^6 - \text{C}_6\text{H}_6)\text{Cr}]$ 5. 4.12

	A	B	C	D	E
1.	1	2	3	4	5
2.	4	3	2	1	5
3.	1	3	2	4	5
4.	1	2	4	3	5

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Test Series Schedule NET Dec. 2018

Inorganic Chemistry	10/11/2018	17/11/2018	24/11/2018
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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Time 02:00 PM to 05:00 PM

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



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