Roll No. $\qquad$
O. M. R. Serial No.

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## M. Sc. (Second Semester) (NEP) <br> EXAMINATION, 2022-23

## CHEMISTRY

## (Inorganic Chemistry-II)

## 

Time : 1:30 Hours ]

Questions Booklet Series

[ Maximum Marks : 75

## Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR AnswerSheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

## (Only for Rough Work)

1. Electronic spectra is observed in the region :
(A) IR
(B) Visible and IR
(C) UV and IR
(D) Visible and UV
2. Which one of the following pairs of electronic configuration does not show more than one electronic states ?
(A) $d^{1}$ and $d^{9}$
(B) $d^{2}$ and $d^{8}$
(C) $d^{3}$ and $d^{7}$
(D) $d^{4}$ and $d^{6}$
3. Generally carbonyls are :
(A) diamagnetic
(B) paramagnetic
(C) ferromagnetic
(D) ferrimagnetic
4. The structure of $\mathrm{C}_{2} \mathrm{~B}_{3} \mathrm{H}_{7}$ carborane is :
(A) Trigonal pyramidal
(B) Tetrahedral
(C) Square planar
(D) Square pyramidal
5. The composition of dimolybdates is :
(A) $\mathrm{R}_{2} \mathrm{O} .2 \mathrm{MoO}_{3} \cdot n \mathrm{H}_{2} \mathrm{O}$
(B) $\mathrm{R}_{2} \mathrm{O} .3 \mathrm{MoO}_{3} . n \mathrm{H}_{2} \mathrm{O}$
(C) $\quad \mathrm{R}_{2} \mathrm{O} .4 \mathrm{MoO}_{3} \cdot n \mathrm{H}_{2} \mathrm{O}$
(D) $\mathrm{R}_{2} \mathrm{O} .8 \mathrm{MoO}_{3} \cdot n \mathrm{H}_{2} \mathrm{O}$
6. The energy diagram for $d^{9}$ is inverse of :
(A) $d^{1}$ configuration
(B) $d^{2}$ configuration
(C) $d^{3}$ configuration
(D) $d^{5}$ configuration
7. Carbonyls are soluble in :
(A) $\mathrm{H}_{2} \mathrm{O}$
(B) liq. $\mathrm{NH}_{3}$
(C) liq. $\mathrm{SO}_{2}$
(D) organic solvents
8. The bond present in carbonyls is :
(A) $\mathrm{M} \stackrel{\sigma}{\longleftarrow} \mathrm{CO}$
(B) $\mathrm{M} \xrightarrow{\pi} \mathrm{CO}$
(C) $\mathrm{M} \underset{\sigma}{\stackrel{\pi}{\rightleftarrows}} \mathrm{CO}$
(D) None of the above
9. Orgel-energy level diagram is used for the interpretation of :
(A) Spin stretching
(B) Rotatory stretching
(C) Spin allowed transitions
(D) All of the above
10. If ' $S$ ' is the absolute value of the spins of the individual electron, the spin multiplicity is given by :
(A) 2 S
(B) $(2 \mathrm{~S}+1)$
(C) $(2 \mathrm{~S}+2)$
(D) $(2 \mathrm{~S}+3)$
11. In mononuclear carbonyls a metal atom is directly linked to :
(A) C atom
(B) O atom
(C) N atom
(D) H atom
12. Boranes are the compounds of :
(A) B and H
(B) C and H
(C) B and N
(D) B, C and H
13. Which one of the following carbonyls does not obey EAN rule?
(A) $\mathrm{Cr}(\mathrm{CO})_{6}$
(B) $\mathrm{V}(\mathrm{CO})_{6}$
(C) $\mathrm{Fe}(\mathrm{CO})_{5}$
(D) $\mathrm{Ni}(\mathrm{CO})_{4}$
14. Nido-carboranes have the general formula :
(A) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+1}$
(B) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+2}$
(C) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+3}$
(D) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+4}$
15. Which one of the following ions does not exist in solution?
(A) $\mathrm{PO}_{4}^{3-}$
(B) $\mathrm{CrO}_{3}^{2-}$
(C) $\quad \mathrm{W}_{2} \mathrm{O}_{7}^{2-}$
(D) $\quad \mathrm{Mo}_{7} \mathrm{O}_{24}^{6-}$
16. The spin allowed electronic transitions occur between energy levels which have :
(A) Different spin multiplicity
(B) Different principal quantum number
(C) Same spin multiplicity
(D) None of the above
17. The number of electrons in the valence shell of the metal in carbonyl is :
(A) 8
(B) 18
(C) 36
(D) 54
18. The introduction of successive CH units to the structure of smaller nidocarboranes involves the elimination of :
(A) $1 \mathrm{BH}_{2}$ unit
(B) $2 \mathrm{BH}_{2}$ units
(C) $3 \mathrm{BH}_{2}$ units
(D) $4 \mathrm{BH}_{2}$ units
19. In isopolyacids $\mathrm{Mo}_{6}$ octahedra do not share at :
(A) Corners
(B) Edges
(C) Faces
(D) None of the above
20. $d-d$ transition is :
(A) ligand-ligand transition
(B) ligand-metal transition
(C) metal-ligand transition
(D) metal-metal transition
21. For a $d^{2}$ system where electron spins are parallel, its spin multiplicity is :
(A) 1
(B) 2
(C) 3
(D) 4
22. Which one of the following is stable borane?
(A) $\quad \mathrm{B}_{4} \mathrm{H}_{10}$
(B) $\mathrm{B}_{5} \mathrm{H}_{9}$
(C) $\mathrm{B}_{5} \mathrm{H}_{11}$
(D) $\mathrm{B}_{6} \mathrm{H}_{12}$
23. Polyacids are generally formed by the elements of the following group of the periodic table :
(A) I A and II A
(B) I B and II B
(C) V B and VI B
(D) VIII group members
24. Which of the following carbonyl does not obey 18 -electrons rule ?
(A) $\mathrm{Cr}(\mathrm{CO})_{6}$
(B) $\mathrm{Mn}(\mathrm{CO})_{5}$
(C) $\mathrm{Fe}(\mathrm{CO})_{5}$
(D) $\mathrm{Ni}(\mathrm{CO})_{4}$
25. The geometry of $\mathrm{Ni}(\mathrm{CO})_{4}$ is :
(A) Octahedral
(B) Square planar
(C) Square pyramidal
(D) Tetrahedral
26. The compounds formed by the combination of NO and metals are called :
(A) Nitrites
(B) Nitrates
(C) Nitrides
(D) Nitrosyls
27. Saturated and lowest triatomic member of LNCCs is :
(A) $\quad \mathrm{M}_{2}(\mathrm{CO})_{12}$
(B) $\quad \mathrm{M}_{3}(\mathrm{CO})_{12}$
(C) $\quad \mathrm{M}_{4}(\mathrm{CO})_{12}$
(D) None of the above
28. Which amongst the following elements does not form ispolyanions?
(A) Vanadium
(B) Chromium
(C) Niobium
(D) Molybdenum
29. The energy state of an orbital is determined by :
(A) Chromatography
(B) Polarimetry
(C) Spectroscopy
(D) Surface tension
30. In nitrosyls NO molecule is linked to the central mental atom through :
(A) N -atom
(B) O -atom
(C) Both N and O -atoms
(D) None of the above
31. The ground state of an atom possesses:
(A) Maximum number of unpaired electrons
(B) Few unpaired electrons
(C) All the paired electrons
(D) None of the above
32. Boranes are :
(A) Highly electron rich compounds
(B) Moderately electron rich compounds
(C) Electron deficient compounds
(D) None of the above
33. The oxidation state of metal in carbonyls is :
(A) zero
(B) four
(C) two
(D) three
34. The geometry of $\mathrm{B}_{5} \mathrm{H}_{9}$ molecule is :
(A) Distorted octahedron
(B) Trigonal pyramidal
(C) Pentagonal
(D) Square pyramidal
35. The polyacids containing more than a single type of anhydrides are called :
(A) Isopolyacids
(B) Heteropolyacids
(C) Peroxyacids
(D) Carboxylic acids
36. Which one of the following is unknown ?
(A) NOI
(B) NOBr
(C) NOCl
(D) NOF
37. The geometry of $\mathrm{Cr}(\mathrm{CO})_{6}$ is :
(A) Tetrahedral
(B) Trigonal planar
(C) Octahedral
(D) Trigonal bipyramidal
38. For Laporte allowed transitions, which one of the following conditions is fulfilled?
(A) $\Delta s= \pm 1$
(B) $\Delta l= \pm 1$
(C) $\Delta m= \pm 1$
(D) $\Delta n= \pm 1$
39. Which of the following species are isoelectronic?
(A) $\quad \mathrm{Mm}(\mathrm{CO})_{5} / \operatorname{Re}(\mathrm{CO})_{5}$
(B) $\mathrm{C} \mathrm{\rho Mo}(\mathrm{CO})_{3} / \mathrm{C} \mathrm{\rho W}(\mathrm{CO})_{3}$
(C) $\mathrm{Co}(\mathrm{CO})_{3} / \operatorname{Ir}(\mathrm{CO})_{3}$
(D) All of the above
40. $\left[\mathrm{V}_{10} \mathrm{O}_{28}\right]^{6-}$ anion contains :
(A) $6 \mathrm{VO}_{6}$ octahedra
(B) $8 \mathrm{VO}_{6}$ octahedra
(C) $10 \mathrm{VO}_{6}$ octahedra
(D) $12 \mathrm{VO}_{6}$ octahedra
41. Racah parameter is represented by :
(A) B
(B) $\mu$
(C) $\eta$
(D) S
42. Which one of the following obeys EAN rule?
(A) Nitrides
(B) Nitrites
(C) Nitrates
(D) Nitrosyls
43. High valence clusters are formed by :
(A) Light transition metals
(B) Heavy transition metals
(C) S-block elements
(D) None of the above
44. The oxidation state of Mn in $\left[\mathrm{Mn}(\mathrm{NO})_{3}(\mathrm{CO})\right]$ is :
(A) 0
(B) -II
(C) + III
(D) -III
45. In carbonyls, CO molecules behave as :
(A) Positive ligands
(B) Negative ligands
(C) Neutral ligands
(D) None of the above
46. Carboranes are mixed hydrides of :
(A) Al and C
(B) C and N
(C) C and B
(D) C, B and N
47. The polyacids containing only one type of acid anhydride are called :
(A) Isopolyacids
(B) Heteropolyacids
(C) Per acids
(D) Amino acids
48. According to spin selection rule :
(A) $\Delta s=0$
(B) $\Delta l=0$
(C) $\Delta s= \pm 1$
(D) $\Delta l= \pm 1$
49. Infrared adsorption spectra of metallic carbonyls is used :
(A) To determine the geometry of metallic carbonyls
(B) To determine the bond order of legated CO
(C) To study reaction rate
(D) All of the above
50. The oxidation state of Fe in $\left[\mathrm{Fe}(\mathrm{NO})\left(\mathrm{H}_{2} \mathrm{O}\right)_{5}\right] \mathrm{SO}_{4}$ is :
(A) zero
(B) +1
(C) -1
(D) +2
51. The colour of sodium nitroprusside is :
(A) Green
(B) Black
(C) Yellow
(D) Ruby-red
52. In complex ion $\left[\mathrm{Fe}(\mathrm{NO})(\mathrm{CN})_{5}\right]^{2-}, \mathrm{Fe}^{2+}$ ion undergoes hybridization :
(A) $s p^{2}$
(B) $s p^{3}$
(C) $d^{2} s p^{3}$
(D) $d^{3} s p^{3}$
53. Optical Rotatory Dispersion (ORD) phenomenon was first studied by :
(A) Frensel
(B) Orgel
(C) Tanabe-Sugano
(D) Frank
54. Which among the following will be paramagnetic ?
(A) $\mathrm{Cr}(\mathrm{CO})_{6}$
(B) $\mathrm{Fe}(\mathrm{CO})_{5}$
(C) $\mathrm{Ni}(\mathrm{CO})_{4}$
(D) None of the above
55. The first HNCC is :
(A) $\operatorname{Re}_{2}(\mathrm{CO})_{10}$
(B) $\mathrm{Re}_{6}(\mathrm{CO})_{10}$
(C) $\mathrm{Re}_{2}(\mathrm{CO})_{16}$
(D) $\mathrm{Rh}_{6}(\mathrm{CO})_{16}$
56. An optically active substance absorbs two circularly polarised components to different extent. The differential absorption is known as :
(A) Circular dichroism
(B) Optical rotation dispersion
(C) Cotton effect
(D) None of the above
57. The general formula for mononuclear carbonyls is :
(A) $\quad \mathrm{M}_{x}(\mathrm{CO})$
(B) $\mathrm{M}(\mathrm{CO})_{y}$
(C) $\quad \mathrm{M}_{x}(\mathrm{CO})_{y}$
(D) None of the above
58. Closo-carboranes have the general formula :
(A) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n}$
(B) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+1}$
(C) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+2}$
(D) $\mathrm{C}_{2} \mathrm{~B}_{n} \mathrm{H}_{n+4}$
59. Which one of the following is not an isopolyacid?
(A) $\mathrm{H}_{2} \mathrm{CrO}_{3} \cdot \mathrm{CrO}_{4}$
(B) $\mathrm{H}_{2} \mathrm{CrO}_{2} \cdot 2 \mathrm{CrO}_{4}$
(C) $\mathrm{H}_{2} \mathrm{CrO} .3 \mathrm{CrO}_{4}$
(D) $3 \mathrm{R}_{2} \mathrm{O}_{2} \cdot \mathrm{P}_{2} \mathrm{O}_{5} \cdot 24 \mathrm{MoO}_{3}$
60. Which one of the following transitions is Laporte forbidden?
(A) $s-p$
(B) $p-s$
(C) $d-d$
(D) None of the above
61. The geometry of $\mathrm{Fe}(\mathrm{CO})_{5}$ is :
(A) Square pyramidal
(B) Trigonal bipyramidal
(C) Tetrahedral
(D) Octahedral
62. Which one of the following is liquid at ordinary temperatures?
(A) $\mathrm{Ni}(\mathrm{CO})_{4}$
(B) $\mathrm{Fe}(\mathrm{CO})_{5}$
(C) $\mathrm{Ru}(\mathrm{CO})_{5}$
(D) All of the above
63. In octahedral complexes, the relation between energies of $t_{2 g}$ and $e_{g}$ sets is:
(A) $t_{2 g}>e_{g}$
(B) $t_{2 g}=e_{g}$
(C) $t_{2 g}<e_{g}$
(D) None of the above
64. The resultant spin angular momentum quantum number ( S ) and the number of unpaired electrons ( $n$ ) are related as below :
(A) $\mathrm{S}=\frac{n}{2}$
(B) $\mathrm{S}=n$
(C) $\mathrm{S}=2 n$
(D) $\mathrm{S}=3 n$
65. Among the following complex ions which do not obey EAN rule ?
(A) $\left[\mathrm{Cr}(\mathrm{NO})(\mathrm{CN})_{5}\right]^{3-}$
(B) $\quad\left[\mathrm{Mn}(\mathrm{NO})(\mathrm{CN})_{5}\right]^{2-}$
(C) $\left[\mathrm{Fe}(\mathrm{NO})\left(\mathrm{H}_{2} \mathrm{O}\right)_{5}\right]^{2+}$
(D) All of the above
66. Which one of the following statements is incorrect?
(A) $d s p^{2}$ hybrid orbital are square planar.
(B) $s p^{2}$ hybrid orbitals are tetrahedral.
(C) Water molecule is $s p^{3}$ hybridised.
(D) $s p^{3} d^{2}$ hybrid orbitals are octahedral.
67. In tetrahedral complexes which one of the following statements is correct?
(A) The energy of $e_{g}$ set is greater than that of $t_{2 g}$ set.
(B) The energy of $t_{2 g}$ set is lower than that of $e_{g}$ set.
(C) The energy of $e_{g}$ set is lower than that of $t_{2 g}$ set.
(D) The energy of $t_{2 g}$ and $e_{g}$ set is equal.
68. In an octahedral complex, non-bonding orbitals are :
(A) $4 s$
(B) $4 p_{x}, 4 p_{y}, 4 p_{z}$
(C) $3 d_{x^{2}-y^{2}}, 3 d_{z^{2}}$
(D) $3 d_{x y}, 3 d_{y z}, 3 d_{z x}$
69. If ' $n$ ' is the number of unpaired electrons, the spin only formula is given by :
(A) $\mu_{\text {eff. }}=\sqrt{n(n+2)}$
(B) $\quad \mu_{\text {eff. }}=\sqrt{n(n+1)}$
(C) $\quad \mu_{\text {eff. }}=\sqrt{(n+2)}$
(D) $\quad \mu_{\text {eff. }}=\sqrt{(n+1)}$
70. Paratungstate A in the following is :
(A) $\left[\mathrm{WO}_{4}\right]^{2-}$
(B) $\left[\mathrm{HW}_{6} \mathrm{O}_{21}\right]^{5-}$
(C) $\left[\mathrm{H}_{3} \mathrm{~W}_{6} \mathrm{O}_{21}\right]^{3-}$
(D) $\left[\mathrm{W}_{12} \mathrm{O}_{41}\right]^{10-}$
71. The central atom in heteropolyacid is :
(A) Cr
(B) Fe
(C) Pt
(D) All of the above
72. Which one of the following statements is incorrect?
(A) Generally metal carbonyls are crystalline solid.
(B) Most of the carbonyls are coloured.
(C) $\quad \mathrm{V}(\mathrm{CO})_{6}$ is diamagnetic.
(D) Carbonyls are insoluble in water.
73. The ground state term symbol for $d^{2}$ electronic configuration is :
(A) ${ }^{1} \mathrm{~S}$
(B) ${ }^{3} \mathrm{P}$
(C) ${ }^{3} \mathrm{~F}$
(D) ${ }^{1} \mathrm{G}$
74. Which amongst the following isoelectronic species has the maximum CO stretching frequency?
(A) $\left[\mathrm{Cr}(\mathrm{CO})_{6}\right]$
(B) $\left[\mathrm{Mn}(\mathrm{CO})_{6}\right]^{+}$
(C) $\left[\mathrm{V}(\mathrm{CO})_{6}\right]^{-}$
(D) $\left[\mathrm{Ti}(\mathrm{CO})_{6}\right]^{2-}$
75. Polyacids have the general formula :
(A) $\mathrm{H}_{12-n}\left[\mathrm{X}\left(\mathrm{MoO}_{4}\right)_{6}\right]$
(B) $\mathrm{R}_{2} \mathrm{O} .3 \mathrm{MoO}_{3}, n \mathrm{H}_{2} \mathrm{O}$
(C) $x \mathrm{H}_{2} \mathrm{O}_{2} \mathrm{P}_{2} \mathrm{O}_{5}, y \mathrm{MoO}_{3}$
(D) $\quad \mathrm{H}_{12-n}\left[\mathrm{X}\left(\mathrm{Mo}_{2} \mathrm{O}_{7}\right)_{6}\right]$
76. In co-ordination compounds, the ligands are :
(A) Nucleophile
(B) Electrophile
(C) Lewis base
(D) Free radical
77. Which one of the following has highest magnetic moment?
(A) $t_{2 g}^{6} e_{g}^{3}$
(B) $t_{2 g}^{6} e_{g}^{4}$
(C) $t_{2 g}^{3} e_{g}^{2}$
(D) $t_{2 g}^{6}$
78. Nido-carboranes have the following structure :
(A) closed chain
(B) open cage
(C) closed cage
(D) trigonal phanar
79. Which one of the following statements is correct?
(A) Metallic carbonyls are $\pi$-acid complexes.
(B) In metallic carbonyls, CO molecule acts as a neutral ligand.
(C) Metallic atom is in low oxidation state in metallic carbonyls.
(D) All of the above
80. The first dinitrogen complex was discovered by :
(A) Allen and Senoff
(B) Wade
(C) Corey
(D) Beck
81. The bonds present in higher boranes are:
(A) Terminal $(2 c-2 e) \mathrm{B}-\mathrm{H}$ bond
(B) $\operatorname{Direct}(2 c-2 e) \mathrm{B}-\mathrm{B}$ bond
(C) Bridging $(3 c-2 e) \mathrm{B}-\mathrm{H}-\mathrm{B}$ bond
(D) All of the above
82. The metal complexes of borane anions are called :
(A) Metalloboranes
(B) Metallocarboranes
(C) Metal carbonyl clusters
(D) Metallic carbide
83. Which one of the following is the strongest ligand?
(A) $\mathrm{NH}_{3}$
(B) $\mathrm{O} \overline{\mathrm{H}}$
(C) $\mathrm{C} \overline{\mathrm{N}}$
(D) $\overline{\mathrm{F}}$
84. Which of the following clusters obey the capping rule?
(A) $\left[\mathrm{Os}_{7}(\mathrm{CO})_{21}\right]$
(B) $\quad\left[\mathrm{Os}_{8}(\mathrm{CO})_{22}\right]^{2-}$
(C) $\left[\mathrm{Os}_{10} \mathrm{C}(\mathrm{CO})_{24}\right]^{2-}$
(D) All of the above
85. The bridged carbonyl among the following is:
(A) $\mathrm{Mn}_{2}(\mathrm{CO})_{10}$
(B) $\quad \mathrm{Fe}_{2}(\mathrm{CO})_{9}$
(C) $\quad \mathrm{Fe}_{3}(\mathrm{CO})_{12}$
(D) $\mathrm{Re}_{2}(\mathrm{CO})_{10}$
86. The geometry of tetraborane anion is:
(A) Tetrahedral
(B) Square planar
(C) Square pyramidal
(D) Trigonal pyramidal
87. What is the true about heteropolyacids ?
(A) In general, they are soluble in water and ether.
(B) They exhibit isomorphism.
(C) They are generally attacked by hydroxyl ions.
(D) All of the above
88. Structure of pentaborane-9 is :
(A) Terahedral
(B) Square pyramidal
(C) Square planar
(D) Pentagonal pyramidal
89. Which one of the following carbonyls is not known?
(A) $\mathrm{Ni}(\mathrm{CO})_{4}$
(B) $\mathrm{Fe}(\mathrm{CO})_{5}$
(C) $\mathrm{Mn}(\mathrm{CO})_{5}$
(D) $\mathrm{Cr}(\mathrm{CO})_{6}$
90. Dioxygen forms complexes in the form of :
(A) Dioxygenyl cation
(B) Peroxo group
(C) Super oxo group
(D) All of the above
91. In $\mathrm{Fe}_{2}(\mathrm{CO})_{9}$ molecule each Fe -atom is :
(A) $d s p^{2}$ hybridised
(B) $d s p^{3}$ hybridised
(C) $d^{2} s p^{3}$ hybridised
(D) $d^{3} s p^{3}$ hybridised
92. Which of the following electronic transitions has maximum energy?
(A) $\sigma \rightarrow \sigma^{*}$
(B) $n \rightarrow \sigma^{*}$
(C) $\pi \rightarrow \pi^{*}$
(D) $n \rightarrow \pi^{*}$
93. Which of the following theories explains the structure of heteropolyacids?
(A) Miolati, Capaux and Rosenheim's theory
(B) Pauling's theory
(C) Keggin's theory
(D) All of the above
94. Select the correct statement :
(A) Energy of bonding MO's is higher than that of antibonding MO's.
(B) Energy of bonding MO's is lower than that of antibonding MO's.
(C) Energy of bonding and antibonding MO's is equal.
(D) None of the above
95. In an endothermic reaction :
(A) Heat is absorbed.
(B) Heat is liberated.
(C) Heat is neither absorbed nor liberated.
(D) None of the above
96. Electron transfer reactions are called :
(A) Oxidation reactions
(B) Reduction reactions
(C) Redox reactions
(D) None of the above
97. A correlation of electron count and structure of HNCCs was introduced by :
(A) Wade
(B) Mingos
(C) Lauher
(D) All of the above
98. 6-polyacids are represented by the general formula :
(A) $\mathrm{H}_{12-n}\left[\mathrm{X}\left(\mathrm{MoO}_{4}\right)_{6}\right]$
(B) $\quad \mathrm{H}_{12-n}\left[\mathrm{X}\left(\mathrm{Mo}_{2} \mathrm{O}_{7}\right)_{6}\right]$
(C) $\quad \mathrm{R}_{2} \mathrm{O} .3 \mathrm{MoO}_{3} \cdot n \mathrm{H}_{2} \mathrm{O}$
(D) $x \mathrm{H}_{2} \mathrm{O}, \mathrm{P}_{2} \mathrm{O}_{5} \cdot y \mathrm{MoO}_{3}$
99. The unit of magnetic moment is :
(A) Poise
(B) Curie
(C) Rutherford
(D) Bohr-Magneton
100. The general formula for polynuclear carbonyls is :
(A) $\quad \mathrm{M}_{x}(\mathrm{CO})$
(B) $\mathrm{M}(\mathrm{CO})_{y}$
(C) $\mathrm{M}_{x}(\mathrm{CO})_{y}$
(D) None of the above
101. Four alternative answers are mentioned for each question as-A, B, C \& D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :
Example:
Question :


Illegible answers with cutting and over-writing or half filled circle will be cancelled.
5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is ny discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.
4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर$A, B, C$ एवं $D$ हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :
प्रश्न :


अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।
5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।

