National Testing Agency

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Coordination Chemistry States of Matter and Chemical Kinetics

Group Number :	1
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Coordination Chemistry States of Matter and Chemical Kinetics

Section Id :	899514122
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Number of Questions :	100
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Section Marks :	100
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	899514154
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 8995149141 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Four successive members of the first row transition elements are listed here with atomic numbers. Which one of these is expected to have highest $E^{o}M^{3+/}M^{2+}$

1. Cr(Z=24)
2. Mn(Z=25)
3. Fe(Z=26)
4. Co(Z=27)

Options :

89951436138. 1

89951436139. 2

89951436140. 3

89951436141. 4

Question Number : 2 Question Id : 8995149142 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Hemoglobin and chlorophyll contain respectively

1. Fe, Co
2. Fe. Mn
3. Mg, Fe
4. Fe, Mg

Options :

89951436142. 1

89951436143. 2

89951436144. 3

89951436145. 4

Question Number : 3 Question Id : 8995149143 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Paramagnetism is given by the relation $\mu = 2\sqrt{s(S+1)}$ magnetons where 's' is the total spin. On this basis, the paramagnetism of Cu^+ ion is

1. 3.88 magnetons
2. 2.83 magnetons
3. 1.41 magnetons
4. zero

Options :

89951436146. 1
89951436147. 2
89951436148. 3
89951436149. 4

Question Number : 4 Question Id : 8995149144 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Maximum magnetic moment is shown by

1. d^5
2. d^6
3. d^7
4. d^8

Options :

89951436150. 1
89951436151. 2
89951436152. 3
89951436153. 4

Question Number : 5 Question Id : 8995149145 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which is NOT a true statement?

1. Ions of d-block elements are coloured due to d-d transition
2. Ions of f-block elements are coloured due to f-f- transition
3. $[Sc(H_2O)_6]^{3+}$, $[Ti(H_2O)_6]^{4+}$ are coloured complexes
4. Cu^+ is colourless ion

Options :
89951436154. 1
89951436155. 2
89951436156. 3
89951436157. 4

Question Number : 6 Question Id : 8995149146 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following set of elements do not show the properties characteristic of d-block elements
1. Cu, Ag, Au
2. Zn, Cd, Hg
3. Sc, Ti, V
4. Fe, Co, Ni

Options :
89951436158. 1
89951436159. 2
89951436160. 3
89951436161. 4

Question Number : 7 Question Id : 8995149147 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

MnO^{4-} is of intense pink colour, though Mn is in (+7) oxidation state. It is due to
1. oxygen gives colour to it
2. charge transfer when Mn gives its electron to oxygen
3. charge transfer when oxygen gives its electron to Mn making Mn(+VI) hence, coloured
4. due to d-d transition

Options :
89951436162. 1
89951436163. 2
89951436164. 3
89951436165. 4

Question Number : 8 Question Id : 8995149148 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

In $[Fe(CN)_5(NO^+)]^{2+}$, Fe has +3 state. It can be decided by

1. magnetic measurement
2. colligative property
3.colour
4.hybridization

Options :

89951436166. 1

89951436167. 2

89951436168. 3

89951436169. 4

Question Number : 9 Question Id : 8995149149 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Select the incorrect statement

1. Ionisation energies of 5d-elements are greater than those of 3d and 4d elements
2. Cu(I) is diamagnetic while Cu(II) is paramagnetic
3. $[Ti(H_2O)_6]^{3+}$ is coloured while $[Sc(H_2O)_6]^{3+}$ is colourless
4. Transition elements cannot form complexes

Options :

89951436170. 1

89951436171. 2

89951436172. 3

89951436173. 4

Question Number : 10 Question Id : 8995149150 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The element Os lies in

1.s-block
2. p-block
3. d-block
4. f-block

Options :

89951436174. 1
89951436175. 2
89951436176. 3
89951436177. 4

Question Number : 11 Question Id : 8995149151 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A transition element X has configuration $[Ar]3d^4$, in its +3 oxidation state. Its atomic number is
1. 25
2. 26
3. 22
4. 19

Options :
89951436178. 1
89951436179. 2
89951436180. 3
89951436181. 4

Question Number : 12 Question Id : 8995149152 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following statements is not correct?
1. $La(OH)_3$ is less basic than $Lu(OH)_3$
2. In lanthanide series ionic radius of Ln3+ ion decreases
3. La is actually an element of transition series rather lanthanide
4. Atomic radius of Zr and Hf are same because of lanthanide contraction

Options :
89951436182. 1
89951436183. 2
89951436184. 3
89951436185. 4

Question Number : 13 Question Id : 8995149153 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The colour of light absorbed by an aqueous solution of $CuSO_4$ is
1. orange-red
2. blue-green
3. yellow
4. violet

Options :
89951436186. 1
89951436187. 2
89951436188. 3
89951436189. 4

Question Number : 14 Question Id : 8995149154 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following elements shows maximum number of different oxidation states in its compounds?
1. Eu
2. La
3. Gd
4. Am

Options :
89951436190. 1
89951436191. 2
89951436192. 3
89951436193. 4

Question Number : 15 Question Id : 8995149155 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The pair of compounds having metals in their highest oxidation states is
1. MnO_2, $FeCl_3$
2. $[MnO_4]^-$, CrO_2Cl_2
3. $[Fe(CN)_6]^{3-}$, $[Co(CN)_3]$
4. $[NiCl_4]^{2-}$, $[CoCl_4]^-$

Options :
89951436194. 1

89951436195. 2
89951436196. 3
89951436197. 4

Question Number : 16 Question Id : 8995149156 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which pair of compounds is expected to show similar colour in aqueous medium?
1. $FeCl_3$ and $CuCl_2$
2. $VOCl_2$ and $CuCl_2$
3. $VoCl_2$ and $FeCl_2$
4. $FeCl_2$ and $MnCl_2$

Options :
89951436198. 1
89951436199. 2
89951436200. 3
89951436201. 4

Question Number : 17 Question Id : 8995149157 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following factors may be regarded as the main cause of lanthanide contraction?
1. Greater shielding of 5d-electron by 4f-electrons
2. Poorer shielding of 5d-electron by 4f-electrons
3. Effective shielding of one 4f-electrons by another in the subshell
4. Poor shielding of one 4f-electrons by another in the subshell

Options :
89951436202. 1
89951436203. 2
89951436204. 3
89951436205. 4

Question Number : 18 Question Id : 8995149158 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Amongst the following identify the species with an atom in +6 oxidation state

1. MnO_4^-
2. $Cr(CN)_6^{3-}$
3. NiF_6^{2-}
4. CrO_2Cl_2

Options :

89951436206. 1

89951436207. 2

89951436208. 3

89951436209. 4

Question Number : 19 Question Id : 8995149159 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Most transition metals

I. forms sets of compounds which display different oxidation states of the metal.

II. form coloured ions in solution

III burn vigorously in oxygen

IV replace H_2 from dilute acids

Of these

1. I, II, III are correct
2. II, III, IV are correct
3. I, II are correct
4. I, II, III and IV are correct

Options :

89951436210. 1

89951436211. 2

89951436212. 3

89951436213. 4

Question Number : 20 Question Id : 8995149160 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Effective atomic number (EAN) of Fe in brown ring complex $[Fe(H_2O)_5NO]^{2+}$
1. 36
2. 37
3. 38
4. 39

Options :
89951436214. 1
89951436215. 2
89951436216. 3
89951436217. 4

Question Number : 21 Question Id : 8995149161 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Magnetic moment of $[Ni(CN)_4]^{2-}$ is zero but that of $[Ni(H_2O)_4]^{2+}$ is 2.83 BM.
1. different oxidation state of Ni in two complexes
2. CN^- is a strong ligand making two unpaired electrons in Ni^{2+} paired while in $[Ni(H_2O)_4]^{2+}$
3. Both (a) and (b)
4. None of the above

Options :
89951436218. 1
89951436219. 2
89951436220. 3
89951436221. 4

Question Number : 22 Question Id : 8995149162 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Atoms of the transition elements are smaller than those of the s-block elements. This is because of
1. usual contraction in size across a horizontal period
2. orbital electrons added to the penultimate d-shell rather than to the outer shell of the atom
3.Both (a) and (b)
4. None of the above

Options :
89951436222. 1

89951436223. 2
89951436224. 3
89951436225. 4

Question Number : 23 Question Id : 8995149163 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is colourless?
1. $[Zn(H_2O)_6]^{2+}$
2. $[V(H_2O)_6]^{2+}$
3. $[Mn(H_2O)_6]^{2+}$
4. $[Fe(H_2O)_6]^{2+}$

Options :
89951436226. 1
89951436227. 2
89951436228. 3
89951436229. 4

Question Number : 24 Question Id : 8995149164 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is not an actinoid?
1. Am
2. Cm
3. Fm
4. Tm

Options :
89951436230. 1
89951436231. 2
89951436232. 3
89951436233. 4

Question Number : 25 Question Id : 8995149165 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The common oxidation state of the elements of lanthanide series is
1. +1
2. +3
3. +4
4. +6

Options :
89951436234. 1
89951436235. 2
89951436236. 3
89951436237. 4

Question Number : 26 Question Id : 8995149166 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The transition elements are not characterized by
1. tendency to form complexes
2. ability to have several oxidation sates
3. greater reactivity from left to right in period
4. tendency to form coloured compounds

Options :
89951436238. 1
89951436239. 2
89951436240. 3
89951436241. 4

Question Number : 27 Question Id : 8995149167 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The paramagnetism of transition element compounds is due to
1. paired electrons spinning in opposite directions
2. unpaired electrons in d and f-orbitals
3. shared valance electrons
4. unpaired electrons in s or p-orbitals

Options :
89951436242. 1

89951436243. 2
89951436244. 3
89951436245. 4

Question Number : 28 Question Id : 8995149168 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The number of d-electrons in Fe^{2+} is not equal to that of
1. p-electrons in neon
2. s-electrons in Mg
3. d-electrons in Fe
4. p-electrons in Cl^- ion

Options :
89951436246. 1
89951436247. 2
89951436248. 3
89951436249. 4

Question Number : 29 Question Id : 8995149169 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The electronic configuration of the element which is just above the element with atomic number 42 in the same periodic group is
1. $[Ar]3d^4 4s^2$
2. $[Ar]3d^3 4s^1$
3. $[Ar]3d^5 4s^1$
4. $[Ar]3d^{10} 4s^1$

Options :
89951436250. 1
89951436251. 2
89951436252. 3
89951436253. 4

Question Number : 30 Question Id : 8995149170 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The yellow colour of chromate changes to orange on acidification due to the formation of

1. CrO_2
2. Cr_2O_3
3. $Cr_2O_7^{2-}$
4. CrO_4^{2-}

Options :

89951436254. 1

89951436255. 2

89951436256. 3

89951436257. 4

Question Number : 31 Question Id : 8995149171 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The ground state electronic configuration $[Ar]3d^5 4s^1$ is that of

1. Cr, Mn^+ and Fe^{2+}
2. Cr, Fe^{2+} and Co^{3+}
3. Cr and Mn^+
4. Cr only

Options :

89951436258. 1

89951436259. 2

89951436260. 3

89951436261. 4

Question Number : 32 Question Id : 8995149172 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Atomic size of gold is almost same as that of silver. It is due to

1. the same crystal structure of silver and gold
2. almost the same electropositive character of the two metals
3. transition metals contraction in a series
4. the effect of lanthanide contration

Options :

89951436262. 1

89951436263. 2
89951436264. 3
89951436265. 4

Question Number : 33 Question Id : 8995149173 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Given $E^{\circ}_{Au3+/Au} = 1.52$ V and $E^{\circ}_{Au3+/Au+} = 1.36$ V. Point out the correct statement of the following

1. Au^{3+} disproportionate into Au^{4+} and Au^{2+} in aqueous solution
2. Au^{3+} disproportionate into Au^{4+} and Au^{+} in aqueous solution
3. Au^{+} disproportionate into Au^{3+} and Au in aqueous solution
4. Au^{+} disproportionate into Au^{2+} and Au in aqueous solution

Options :

89951436266. 1
89951436267. 2
89951436268. 3
89951436269. 4

Question Number : 34 Question Id : 8995149174 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following has five donor (coordinating) sites?

1. Triethylene tetramine
2. Ethylenediamine tetra acetate ion
3. Ethylenediamine triacetate ion
4. Diethylene triamine

Options :

89951436270. 1
89951436271. 2
89951436272. 3
89951436273. 4

Question Number : 35 Question Id : 8995149175 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The IUPAC name of the red coloured complex $[Fe(C_4H_7O_2N_2)_2]$ obtained from the reaction of Fe^{2+} and dimethyl glyoxime

1. bis (dimethyl oxime) ferrate (II)
2. bis (dimethyl oxide) iron (II)
3. bis (2,3 butanediol dioximato) iron (II)
4. bis (2,3-buthanedione diominato) iron (II)

Options :

89951436274. 1

89951436275. 2

89951436276. 3

89951436277. 4

Question Number : 36 Question Id : 8995149176 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The IUPAC name for the coordination compound $Ba[BrF_4]_2$ is

1. Barium tetraflurobromate(V)
2. Barium tetraflurobromate(III)
3. Barium bis(tetrafluorobromate)(III)
4. Barium tetraflurobromate(II)

Options :

89951436278. 1

89951436279. 2

89951436280. 3

89951436281. 4

Question Number : 37 Question Id : 8995149177 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$K_2[OsCl_5N]$ is named as:

1. Potassium pentachloro azo osmate (VI)
2. Potassium pentachloro nitridoosmate (VI)
3. Potassium pentachloro azidoosmate (VI)
4. Potassium pentachloro nitronium osmate (II)

Options :

89951436282. 1
89951436283. 2
89951436284. 3
89951436285. 4

Question Number : 38 Question Id : 8995149178 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The geometry of $Ni(CO)_4$ and $[Ni(PPh_3)_2Cl_2]$ are
1. both square planar
2. tetrahedral and square planar
3. both tetrahedral
4. square planar and tetrahedral

Options :
89951436286. 1
89951436287. 2
89951436288. 3
89951436289. 4

Question Number : 39 Question Id : 8995149179 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The $[Fe(CN)_6]^{3-}$ complex ion
1. exhibits planar geometry
2. is diamagnetic
3. should be very stable
4. has 2 unpaired electrons

Options :
89951436290. 1
89951436291. 2
89951436292. 3
89951436293. 4

Question Number : 40 Question Id : 8995149180 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is non-conducting?
1. $CoCl_3.6NH_3$
2. $CoCl_3.5NH_3$
3. $CoCl_3.4NH_3$
4. $CoCl_3.3NH_3$

Options :

89951436294. 1
89951436295. 2
89951436296. 3
89951436297. 4

Question Number : 41 Question Id : 8995149181 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following statement is correct?
1. Geometrical isomerism is not observed in complexes of CN 4 having tetrahedral geometry
2. Square planar complexes generally do not show geometrical isomerism
3. The square planar complex of general formulae Ma_3b or Mab_3 exhibits cis-trans isomerism
4. The plantinum glycinato complex, $[Pt(Gly)_2]$ does not show geometrical isomerism

Options :

89951436298. 1
89951436299. 2
89951436300. 3
89951436301. 4

Question Number : 42 Question Id : 8995149182 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The number of geometrical isomers for octahedral $[Co(NH_3)_2Cl_4]^-$, square planar $AuCl_2Br_2^-$ and $[Co(NO_2)(NH_3)_5]^{2+}$ are
1. 2, 2, 2
2. 2, 2, no isomerism
3. 3,2,2
4. 2,3, no isomerism

Options :

89951436302. 1
89951436303. 2
89951436304. 3
89951436305. 4

Question Number : 43 Question Id : 8995149183 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

How the isomeric complexes $[Co(NH_3)_6][Cr(NO_2)_6]$ and $[Cr(NH_3)_6][Co(NO_2)_6]$ can be distinguished from one another by

1. conductivity measurement
2. measuring magnetic moments
3. electrolysis of their aqueous solutions
4. optical measurements

Options :

89951436306. 1
89951436307. 2
89951436308. 3
89951436309. 4

Question Number : 44 Question Id : 8995149184 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Octahedral complex of Ni(II) must be

1. inner orbital
2. Outer orbital
3. inner or outer orbital depending upon the strong or weak ligand
4. inner orbital or outer orbital independent of the nature of the ligand

Options :

89951436310. 1
89951436311. 2
89951436312. 3
89951436313. 4

Question Number : 45 Question Id : 8995149185 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

For the correct assignment of electronic configuration of a complex, the valence bond theory often requires the measurement of

1. molar conductance
2. optical activity
3. magnetic moment
4. dipole moment

Options :

89951436314. 1

89951436315. 2

89951436316. 3

89951436317. 4

Question Number : 46 Question Id : 8995149186 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The EAN of metal atoms in $Fe(NO)_2(CO)_2$ and $Co_2(CO)_8$ respectively are

1. 34, 35
2. 34, 36
3. 36, 36
4. 36, 35

Options :

89951436318. 1

89951436319. 2

89951436320. 3

89951436321. 4

Question Number : 47 Question Id : 8995149187 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Following Sidwick's rule of EAN, $Co_2(CO)x$ will be

1. $Co_2(CO)_4$
2. $Co_2(CO)_3$
3. $Co_2(CO)_8$
4. $Co_2(CO)_{10}$

Options :
89951436322. 1
89951436323. 2
89951436324. 3
89951436325. 4

Question Number : 48 Question Id : 8995149188 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Select the complex that involves outer orbital hybridization of certain metal ion
1. $[V(NH_3)_6]^{3+}$
2. $[Zn(NH_3)_6]^{2+}$
3. $[Cr(NH_3)_6]^{3+}$
4. $[Co(NH_3)_6]^{3+}$

Options :
89951436326. 1
89951436327. 2
89951436328. 3
89951436329. 4

Question Number : 49 Question Id : 8995149189 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which is not a π-acceptor ligand?
1. I_3^-
2. NO^+
3. $(CH_3)P$
4. CN^-

Options :
89951436330. 1
89951436331. 2
89951436332. 3
89951436333. 4

Question Number : 50 Question Id : 8995149190 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Which of the following is a spin-paired complex ion?

1. $[Cr(NH_3)_6]^{3+}$
2. $[Cr(CN)_6]^{3-}$
3. $[Fe(C_2O_4)_3]^{3-}$
4. $[Co(NH_3)_6]^{3+}$

Options :

89951436334. 1

89951436335. 2

89951436336. 3

89951436337. 4

Question Number : 51 Question Id : 8995149191 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The compressibility of a gas is less than unity at STP. Therefore,

1. $V_m > 22.4\,L$
2. $V_m < 22.4\,L$
3. $V_m = 22.4\,L$
4. $V_m > 44.8\,L$

Options :

89951436338. 1

89951436339. 2

89951436340. 3

89951436341. 4

Question Number : 52 Question Id : 8995149192 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Double refraction shown by a crystal is characteristic property called:

1. Anisotropy
2. Isotropy
3. Thixotropy
4. Dispersion

Options :

89951436342. 1
89951436343. 2
89951436344. 3
89951436345. 4

Question Number : 53 Question Id : 8995149193 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A flask of capacity one L contains NH_3 at 1 atm and 25 °C. A spark is passed through until all the NH_3 is decomposed into N_2 and H_2. Calculate the pressure of gases left at 25 °C.

1.2 atm
2.0.5 atm
3.1.5 atm
4.1 atm

Options :

89951436346. 1
89951436347. 2
89951436348. 3
89951436349. 4

Question Number : 54 Question Id : 8995149194 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Since the atomic weights of C, N and O are 12, 14 and 16u, respectively. Among the following pair, the pair that will diffuse at the same rate is

1. carbon dioxide and nitrous oxide.
2. carbon dioxide and nitrogen peroxide.
3. carbon dioxide and carbon monoxide.
4. nitrous oxide and nitrogen peroxide.

Options :

89951436350. 1
89951436351. 2
89951436352. 3
89951436353. 4

Question Number : 55 Question Id : 8995149195 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If the pressure of a given mass of gas is reduced to half and temperature is doubled simultaneously, the volume will be

1. same as before.
2. twice as before.
3. four times as before.
4. one fourth as before.

Options :

89951436354. 1

89951436355. 2

89951436356. 3

89951436357. 4

Question Number : 56 Question Id : 8995149196 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

At STP, a container has 1 mol of Ar, 2 mol of CO_2, 3 mol of O_2 and 4 mol of N_2. Without changing the total pressure if 1 mol of O_2 is removed, the partial pressure of O_2 is

1. changed by about 26%.
2. halved.
3. unchanged.
4. changed by 33%.

Options :

89951436358. 1

89951436359. 2

89951436360. 3

89951436361. 4

Question Number : 57 Question Id : 8995149197 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The average speed of an ideal gas molecule at 27 °C is 0.3 $m.s^{-1}$. Calculate average speed at 927 °C.
1.0.6 $m.s^{-1}$
2.6 $m.s^{-1}$
3.60 $m.s^{-1}$
4.8 $m.s^{-1}$

Options :
89951436362. 1
89951436363. 2
89951436364. 3
89951436365. 4

Question Number : 58 Question Id : 8995149198 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Joule-Thompson expansion of an ideal gas is an
1. isothermal process.
2. isobaric process.
3. isoenthalpic process.
4. ideal process.

Options :
89951436366. 1
89951436367. 2
89951436368. 3
89951436369. 4

Question Number : 59 Question Id : 8995149199 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The average kinetic energy of two moles of CO_2 at a certain temperature is 1800 cal. The temperature of the gas is
1.300 K
2.150 K
3.200 K
4.400 K

Options :

89951436370. 1
89951436371. 2
89951436372. 3
89951436373. 4

Question Number : 60 Question Id : 8995149200 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Equal volumes of SO_2 and He at a temperature T and pressure p to effuse through a hole. The rate of effusion of helium is

1. equal to the rate of effusion of SO_2.
2. four times the rate of effusion of SO_2.
3. half of the rate of effusion of SO_2.
4. twice the rate of effusion of SO_2.

Options :

89951436374. 1
89951436375. 2
89951436376. 3
89951436377. 4

Question Number : 61 Question Id : 8995149201 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The vapour density of gas is 11.2. The volume occupied by 11.2 g of this gas at STP is

1. 22.4 L
2. 11.2 L
3. 1 L
4. 2.24 L

Options :

89951436378. 1
89951436379. 2
89951436380. 3
89951436381. 4

Question Number : 62 Question Id : 8995149202 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

NH_3 gas is liquefied more easily than N_2 thereby
1. van der Waals constants a and b of NH_3 is higher than that of N_2.
2. van der Waals constants a and b of NH_3 is less than that of N_2.
3. a of $NH_3 > a$ of N_2, but b of $NH_3 < b$ of N_2
4. a of $NH_3 < a$ of N_2, but b of $NH_3 > b$ of N_2

Options :
89951436382. 1
89951436383. 2
89951436384. 3
89951436385. 4

Question Number : 63 Question Id : 8995149203 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

What is the ratio of u_{rms}/u_{mp} for methane gas at 300K
1.1.22
2.2.22
3.2.08
4.1.08

Options :
89951436386. 1
89951436387. 2
89951436388. 3
89951436389. 4

Question Number : 64 Question Id : 8995149204 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following fcc structures contains cations in the alternate tetrahedral voids?
1. Na_2O
2. ZnS
3. CaF_2
4. CaO

Options :
89951436390. 1
89951436391. 2
89951436392. 3
89951436393. 4

Question Number : 65 Question Id : 8995149205 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Glass is a
1. microcrystalline solid.
2. supercooled fluid.
3. gel.
4. polymeric mixture.

Options :
89951436394. 1
89951436395. 2
89951436396. 3
89951436397. 4

Question Number : 66 Question Id : 8995149206 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following statements are correct?

(I) The coordination number of cation occupying a tetrahedral hole is 4.
(II) The coordination number of cation occupying a octahedral hole is 6.
(III) In Schottky defects, density of the lattice decreases.

1. I , II
2. II, III
3. I, II, III
4. I, III

Options :

89951436398. 1
89951436399. 2
89951436400. 3
89951436401. 4

Question Number : 67 Question Id : 8995149207 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

When NaCl is doped with $MgCl_2$, the nature of defect produced is

1. interstitial.
2. Frenkel.
3. Schottky.
4. none of these.

Options :

89951436402. 1
89951436403. 2
89951436404. 3
89951436405. 4

Question Number : 68 Question Id : 8995149208 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

In a fcc arrangement of metallic atoms, what is the relative ration of the sizes of tetrahedral and octahedral voids?
1.0.543
2.0.732
3.0.414
4.0.637

Options :
89951436406. 1
89951436407. 2
89951436408. 3
89951436409. 4

Question Number : 69 Question Id : 8995149209 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

In a solid AB having the NaCl structure, A atoms occupy the corners of the cubic unit cell. If all the fcc atoms along one of the axes are removed, then the resultant stoichiometry of the solid is
1. AB_2
2. A_2B
3. A_4B_3
4. A_3B_4

Options :
89951436410. 1
89951436411. 2
89951436412. 3
89951436413. 4

Question Number : 70 Question Id : 8995149210 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The number of atoms in a hcp unit cell is
1.4
2.6
3.12
4.17

Options :
89951436414. 1
89951436415. 2
89951436416. 3
89951436417. 4

Question Number : 71 Question Id : 8995149211 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following is used as a piezoelectric material?
1. Silicones
2. Silica gel
3. Kieselguhr
4. Quartz

Options :
89951436418. 1
89951436419. 2
89951436420. 3
89951436421. 4

Question Number : 72 Question Id : 8995149212 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The appearance of colour in solid alkali metal halides is generally due to
1. Frenkel defect.
2. interstitial positions.
3. *F*-centres.
4. Schottky defect.

Options :
89951436422. 1
89951436423. 2
89951436424. 3
89951436425. 4

Question Number : 73 Question Id : 8995149213 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Structure of a mixed oxide is ccp. The cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovalent metal B. The formula of oxide is

1. ABO_2
2. A_2BO_2
3. $A_2B_3O_4$
4. AB_2O_2

Options :

89951436426. 1

89951436427. 2

89951436428. 3

89951436429. 4

Question Number : 74 Question Id : 8995149214 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The total number of symmetry elements for a cubic crystal are:

1. 7
2. 14
3. 23
4. 32

Options :

89951436430. 1

89951436431. 2

89951436432. 3

89951436433. 4

Question Number : 75 Question Id : 8995149215 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Triclinic crystal system has the following unit cell dimensions:

1. $a = b = c$ and $\alpha = \beta = \gamma = 90^\circ$
2. $a \neq b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$
3. $a = b \neq c$ and $\alpha = \beta = 90^\circ, \gamma = 120^\circ$
4. $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90^\circ$

Options :

89951436434. 1

89951436435. 2

89951436436. 3

89951436437. 4

Question Number : 76 Question Id : 8995149216 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the reaction system: $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$, volume is suddenly reduced to half its value . If the reaction is of first order with O_2 and second order with respect to NO, the rate of reaction will be

1. diminish to one-fourth of its initial value.
2. diminish to one-eight of its initial value.
3. increase to eight times of its initial value.
4. increase to four times of its initial value.

Options :

89951436438. 1

89951436439. 2

89951436440. 3

89951436441. 4

Question Number : 77 Question Id : 8995149217 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The half-life of a radioactive isotope is three hours. If the initial mass of the isotope were 256 g, the mass of it remaining undecayed after 18 h would be

1. 4.0 g
2. 8.0 g
3. 12.0 g
4. 16.0 g

Options :

89951436442. 1
89951436443. 2
89951436444. 3
89951436445. 4

Question Number : 78 Question Id : 8995149218 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A reaction involving two different reactants never be

1. unimolecular reaction.
2. first order reaction.
3. second order reaction.
4. bimolecular reaction.

Options :

89951436446. 1
89951436447. 2
89951436448. 3
89951436449. 4

Question Number : 79 Question Id : 8995149219 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Rate of a reaction can be expressed by Arrhenius equation as: $k = Ae^{-E_a/RT}$

In this equation, E_a represents

1. the energy above which all the colliding molecules will react.
2. the energy below which colliding molecules will not react.
3. the total energy of the reacting molecules at a temperature, T
4. the fraction of molecules with energy greater than the activation energy of the reaction.

Options :

89951436450. 1

89951436451. 2

89951436452. 3

89951436453. 4

Question Number : 80 Question Id : 8995149220 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A reaction was found to be second order with respect to the concentration of carbon monoxide. If the concentration of carbon monoxide is doubled, with everything else kept the same, the rate of reaction will

1. remain unchanged
2. triple
3. increase by a factor of 4
4. double

Options :

89951436454. 1

89951436455. 2

89951436456. 3

89951436457. 4

Question Number : 81 Question Id : 8995149221 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The half-life of a first order reaction is 10 min. If initial amount is 0.08 $mol.L^{-1}$ and concentration at some instant 0.01 $mol.L^{-1}$, then *t* is
1.10 min.
2.30 min.
3.20 min.
4.40 min.

Options :
89951436458. 1
89951436459. 2
89951436460. 3
89951436461. 4

Question Number : 82 Question Id : 8995149222 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The rate of reaction is doubled for every 10° rise in temperature. The increase in reaction rate as a result of temperature rise from 10° to 100° is
1.112
2.512
3.400
4.614

Options :
89951436462. 1
89951436463. 2
89951436464. 3
89951436465. 4

Question Number : 83 Question Id : 8995149223 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

It takes 10 min for the decomposition of 50% H_2O_2. If the reaction is of first order, the rate constant will be

1.0.693

2.0.00693

3.0.0693

4.6.93

Options :

89951436466. 1

89951436467. 2

89951436468. 3

89951436469. 4

Question Number : 84 Question Id : 8995149224 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The plot of log k versus $1/T$ is linear with a slope of

1. $\frac{E_a}{R}$
2. $\frac{-E_a}{R}$
3. $\frac{E_a}{2.303R}$
4. $\frac{-E_a}{2.303R}$

Options :

89951436470. 1

89951436471. 2

89951436472. 3

89951436473. 4

Question Number : 85 Question Id : 8995149225 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

According to collision theory of reaction rates
1. every collision between reactant molecules leads to a chemical reaction.
2. rate of reaction is proportional to the velocity of the molecules.
3. rate of reaction is proportional to the average energy of the molecules.
4. rate of reaction is proportional to the number of collision per second.

Options :
89951436474. 1
89951436475. 2
89951436476. 3
89951436477. 4

Question Number : 86 Question Id : 8995149226 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Rate constant of a first order reaction is 0.0693 min^{-1}. If we start with 20 $mol.L^{-1}$, it is reduced to 2.5 $mol.L^{-1}$ in
1.10 min
2.20 min
3.30 min
4.40 min

Options :
89951436478. 1
89951436479. 2
89951436480. 3
89951436481. 4

Question Number : 87 Question Id : 8995149227 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Rate of formation of SO_3 in the following reaction is 100 $g.min^{-1}$

$$2SO_2 + O_2 \rightarrow 2SO_3.$$

Hence, the rate of disappearance of O_2 is

1.50 $g.min^{-1}$
2.100 $g.min^{-1}$
3.200 $g.min^{-1}$
4.20 $g.min^{-1}$

Options :

89951436482. 1
89951436483. 2
89951436484. 3
89951436485. 4

Question Number : 88 Question Id : 8995149228 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the reaction, $A_2 + 2B \rightarrow 2AB$

$[A_2]$	[B]	$-\frac{d[A_2]}{dt}$
0.1 M	0.2 M	1 x 10-2 $M.s^{-1}$
0.2 M	0.2 M	2 x 10-2 $M.s^{-1}$
0.2 M	0.4 M	8 x 10-2 $M.s^{-1}$

Order of reaction with respect to A_2 and B are respectively

1.1 and 2
2.2 and 1
3.1 and 1
4.2 and 2

Options :

89951436486. 1
89951436487. 2
89951436488. 3
89951436489. 4

Question Number : 89 Question Id : 8995149229 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

When initial concentration of a reactant is doubled in a reaction, its half-life period is not affected. The order of the reaction is

1. zero.
2. first.
3. second.
4. more than zero but less than first.

Options :

89951436490. 1

89951436491. 2

89951436492. 3

89951436493. 4

Question Number : 90 Question Id : 8995149230 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For a reaction 2A → 3B, if the rate of formation of B is x mol.L^{-1}, the rate of consumption of A is

1. X
2. $3x/2$
3. $2x/3$
4. $3x$

Options :

89951436494. 1

89951436495. 2

89951436496. 3

89951436497. 4

Question Number : 91 Question Id : 8995149231 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A reaction having equal energies of activation for forward and reverse reaction has

1. $\Delta S = 0$
2. $\Delta G = 0$
3. $\Delta H = 0$
4. $\Delta G = \Delta H = \Delta S = 0$

Options :

89951436498. 1
89951436499. 2
89951436500. 3
89951436501. 4

Question Number : 92 Question Id : 8995149232 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For a given reaction $t_{1/2} = \frac{1}{ka}$, the order of the reaction is

1. 1
2. 0
3. 3
4. 2

Options :

89951436502. 1
89951436503. 2
89951436504. 3
89951436505. 4

Question Number : 93 Question Id : 8995149233 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A chemical reaction was carried out at 300 K, and 280 K. The rate constant were found to be k_1 and k_2 respectively, then

1. $k_2 = 4k_1$
2. $k_2 = 2k_1$
3. $k_2 = 0.25\, k_1$
4. $k_2 = 0.5k_1$

Options :
89951436506. 1
89951436507. 2
89951436508. 3
89951436509. 4

Question Number : 94 Question Id : 8995149234 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

In a reaction, A + B → product, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentrations of both the reactants are doubled. Rate law for the reaction can be written as
1. Rate = $k[A][B]^2$
2. Rate = $k[A]^2[B]^2$
3. Rate = $k[A][B]$
4. Rate = $k[A]^2 [B]$

Options :
89951436510. 1
89951436511. 2
89951436512. 3
89951436513. 4

Question Number : 95 Question Id : 8995149235 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The rate of reaction, A + B → Products is given by the equation $r = k$ [A] [B]. If B is taken in large excess, the order of the reaction would be
1. 2
2. 1
3. 0
4. Unpredictable

Options :
89951436514. 1
89951436515. 2
89951436516. 3

89951436517. 4

Question Number : 96 Question Id : 8995149236 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Effect of temperature on reaction rate is given by
1. Claisen-Clapeyron equation.
2. Arrhenius equation.
3. Gibbs-Helmholtz equation.
4. Kirchoff's equation.

Options :
89951436518. 1
89951436519. 2
89951436520. 3
89951436521. 4

Question Number : 97 Question Id : 8995149237 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The activation energy of a reaction can be determined by
1. changing the concentration of reactants.
2. evaluating rate constant at standard temperature.
3. evaluating rate constant at two different temperatures.
4. by doubling concentration of reactants.

Options :
89951436522. 1
89951436523. 2
89951436524. 3
89951436525. 4

Question Number : 98 Question Id : 8995149238 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

When we increase the temperature, the rate of reaction increases because of
1. more number of collisions.
2. decrease in mean free path.
3. more number of energetic collisions.
4. less number of energetic collisions.

Options :
89951436526. 1
89951436527. 2
89951436528. 3
89951436529. 4

Question Number : 99 Question Id : 8995149239 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For a reaction, $A + B \rightarrow 2C + D$, which one is the incorrect statement?
1. Rate of disappearance of A = Rate of disappearance of B
2. Rate of disappearance of A = Rate of appearance of D
3. Rate of disappearance of B = 2 x rate of appearance of C
4. Rate of disappearance of B = ½ x rate of appearance of C

Options :
89951436530. 1
89951436531. 2
89951436532. 3
89951436533. 4

Question Number : 100 Question Id : 8995149240 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A zero order reaction is one
1. in which reactants do not react.
2. in which one of the reactants is in large excess.
3. whose rate is uniform and not affected by time.
4. whose rate increases with time.

Options :

89951436534. 1

89951436535. 2

89951436536. 3

89951436537. 4