JEE-Main-22-01-2025 (Memory Based)
[MORNING SHIFT]
Chemistry

Question: What is the charge on metal and shape of complex of $[NiCl]_2^{4-}$ respectively?
Options:
(a) +2, Tetrahedral
(b) +2, Square planar
(c) +4, Tetrahedral
(d) +4, Square Planar

Answer: (a)

Question: Compare boiling point of given solutions

(i) 10-4 NaCl
(ii) 10-3 NaCl
(iii) 10-2 NaCl
(iv) 10-4 urea
Options:
(a) I > II >III > IV
(b) III > II > I > IV
(c) II > I > III > IV
(d) III > I > II > IV
Answer: (b)

Question: The correct decreasing order of electronegativity is

Options:
(a) F > Cl > I > Br
(b) Cl > F > Br > 1
(c) F > Cl > Br > I
(d) Br > F > I > Cl
Answer: (c)

Question: Which of the following has maximum size out of Al3, Mg2+, F-, Na+
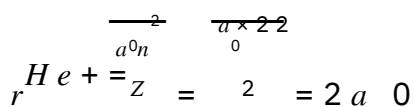
Options:
(a) Al3+
(b) Mg2
(c) F-
(d) Na+
Answer: (c)

Question: If the radius of the first orbit of the H atom is a0, then what is the radius of the first excited state of He+ ion?
Options:

(a) $\frac{2}{a^0}$

(b) $2a0$
(c) $a0$
(d) $5a0$

Answer: (b)

$$r_{He+} = \frac{a_0 n^2}{z} = \frac{a_0 \times 2^2}{2} = 2a_0$$

Question: Which has 7 electrons in the f subshell?
Options: (a) Eu3+ (b) Gd2+ (c) Eu2+ (d) Ce3+ Answer:
(c)

Question: The electrolysis product of which is

H2S2O8?

Options:
(a) Dil H2SO4
(b) Cu SO4(ag)
(c) Conc. H2SO4
(d) None of these
Answer: (c)

Question: Calculate Number of stereoisomers of
CH3 — CH = CH — CH — CH3

OH

Options:
(a) 4
(b) 2
(c) 6
(d) 8
Answer: (a)

Question: If AlCl3 is electrolysed for 30 minutes using a current of 2A . How much of Al will be deposited at the cathode?
(F = 96500c, molar mass Al = 279/Mol)
Options:
(a) 0.1679
(b) 0.2239
(c) 0.3359
(d) 0.4519
Answer: (c)
Q = I × t = 2 × 30 × 60 = 3600 C.

$$n_{e^-} = \frac{Q}{F} = \frac{3600}{96500} = 0.0373 \; mol \quad n_{Al} = \frac{0.0373}{3} = 0.0126 \; mol$$

wt of Al = 0.0124 × 27 = 0.335 g

Question: CO2(g) + C(s) ⇌ 2CO(g)

If initial pressure of CO2 is 0.6 atm and after equilibrium is established, total pressure is 0.8 atm. Then, find Kp.

Options: (a)
0.8 atm (b)
0.4 atm (c)
0.5 atm (d)
0.2   atm
Answer: (b)

$CO_2 + C \rightleftharpoons 2CO$

t₀=0 ~~0.6~~
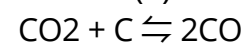
~~0.6 - x -~~   2x

Given   0.6 - x = 2x = 0.8

          0.6 + x = 0.8

               x = 0.2

$$\therefore pK = \frac{P_{CO}}{P_{CO_2}} = \frac{(0.4)^2}{(0.4)} = 0.4 \; atm$$
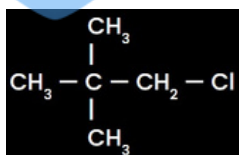
Question: In the Carius method of estimation of chlorine a compound of 180g produces 144g of AgCl. Find percentage composition of chlorine?
Options:
(a) 20%
(b) 36%
(c) 23%
(d) 25%
Answer: (a)

Question: Statement-1: CH3 — O — CH2 — Cl will show nucleophilic substitution by SN1 mechanism in protic medium

Statement-2:   will not undergo nucleophilic substitution via SN2 mechanism easily.
Options:
(a) Statement-I and Statement-II both are correct
(b) Statement-I and statement-II both are incorrect
(c) Statement-I is correct but statement-II is incorrect
(d) Statement-I is incorrect but statement-II is correct
Answer: (a)

Question: In CFSE (crystal field splitting energy), Δ0 is zero for

Options:
(a) K4 [FeC(N)8]
(b) K3[FeC(N)6]
(c) K3[FeF6]
(d) K2[MnF6]
Answer: (c)

n K[FeF]₆ the e- ca nfig = $+ \, t_{2g}^3 eg^2$
CFSE = 0.4 × t 2g + 0.6eg

= - 0.4 × 3 + 0.6 × 2 = 0.

Question: Which of the following acids is present in a vitamin C ?
Options:
(a) Ascorbic acid
(b) Saccharic acid
(c) Aspartic acid
(d) Adipic acid
Answer: (a)

Question: Which of the following Electronegativity order is incorrect?
Options:
(a) Mg < Be < B < N
(b) Al < Si < C < N
(c) S < Cl < O < F
(d) Al < Mg < B < N
Answer: (d)

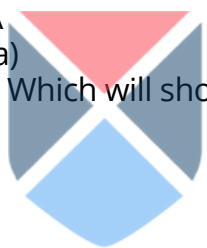Question: An electron of He+ is present in the 3rd excited state. Find its de-Broglie wavelength.
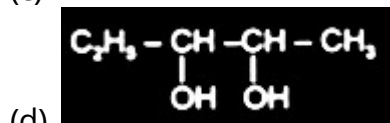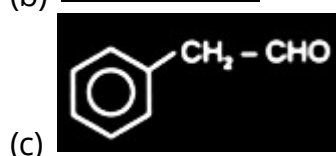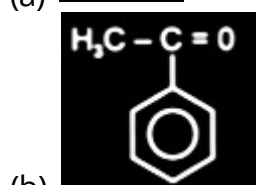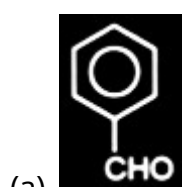Options:
(a) 6.28Å
(b) 1.66 Å
(c) 3.32Å
(d) 13.28Å
Answer: (a)

Question: Which will show a positive Fehling test?
Options:

(a)

(b)

(c)

(d)
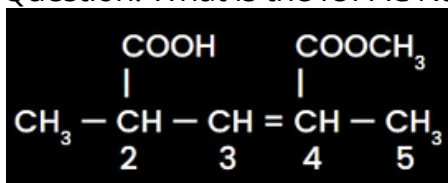Answer: (c)

Question: What is the IUPAC Name of the given compound?

Options: (a) 4-methoxy 2-methyl Pent-3-enoic acid carbonyl (b) 4-methoxy 3-methyl Pent-3-enoic acid carbonyl (c) 2-methoxy 4-methyl Pent-3-enoic acid carbonyl (d) 4-methoxy 2-methyl Pent-2-enoic acid carbonyl Answer: (a)

Question: When ethanol is treated with benzene diazonium chloride is forms:
Options:
(a) Arenes
(b) Methane
(c) Amines
(d) Ethyl alcohol
Answer: (a)

Question: If the work function of Cs and Fr is 1.9 & 2.7 eV. If light of λ = 500 nm. Which element will show photoelectric effect?
Options:
(a) Caesium
(b) Fransium
(c) Both have same
(d) None of the above
Answer: (a)

$$= \quad \lambda(A°) = 5000 = 2.48 \, eV$$

$$E = \frac{12400}{\lambda} \quad \frac{12400}{5000}$$

KE = hv - hv0
hv > hv0 $\Rightarrow$ Cs will show

Question: Which of the following Statements is Incorrect?

Options:
(a) Melting Point of cis-2-butene is greater than trans 2-butene
(b) 2-methyl 2-butene has 2 Geometrical isomerism
(c) Dipole moment of cis 2-butene is greater than trans 2-butene
(d) In trans Isomer identical groups are opposite to each other
Answer: (b)

Question: 4f' configuration is possible for

(a) Eu3+, (b) Eu2+, (c) Gd3+, (d) Tb3+, (e) Sm2+
Options:

(a) (a) and (c)
(b) (b) and (c)
(c) (d) and (e)
(d) Only (c)
Answer: (b)

Atomic Number	Name	Symbol	Electronic configurations*		
			Ln	Ln^{2+}	Ln^{3+}
57	Lanthanum	La	$5d^1 6s^2$	$5d^1$	$4f^0$
58	Cerium	Ce	$4f^1 5d^1 6s^2$	$4f^2$	$4f^1$
59	Praseodymium	Pr	$4f^3 6s^2$	$4f^3$	$4f^2$
60	Neodymium	Nd	$4f^4 6s^2$	$4f^4$	$4f^3$
61	Promethium	Pm	$4f^5 6s^2$	$4f^5$	$4f^4$
62	Samarium	Sm	$4f^6 6s^2$	$4f^6$	$4f^5$
63	Europium	Eu	$4f^7 6s^2$	$4f^7$	$4f^6$
64	Gadolinium	Gd	$4f^7 5d^1 6s^2$	$4f^7 5d^1$	$4f^7$
65	Terbium	Tb	$4f^9 6s^2$	$4f^9$	$4f^8$
66	Dysprosium	Dy	$4f^{10} 6s^2$	$4f^{10}$	$4f^9$
67	Holmium	Ho	$4f^{11} 6s^2$	$4f^{11}$	$4f^{10}$
68	Erbium	Er	$4f^{12} 6s^2$	$4f^{12}$	$4f^{11}$
69	Thulium	Tm	$4f^{13} 6s^2$	$4f^{13}$	$4f^{12}$
70	Ytterbium	Yb	$4f^{14} 6s^2$	$4f^{14}$	$4f^{13}$
71	Lutetium	Lu	$4f^{14} 5d^1 6s^2$	$4f^{14} 5d^1$	$4f^{14}$

Question: CO2 gas is taken at 1 atm, 273K. Now it is allowed to pass through 01 M Ca/(OH)2 aq. Solution. Excess amount of Ca(OH)2 is neutralized with 40 mL of 0.1 M HCl. Then find volume of Ca(OH)2 initial taken if half of the amount of Ca(OH02 is reacted with CO2
Options:
(a) 40 mL
(b) 20 mL
(c) 80 mL
(d) 50 mL
Answer: (a)
nHCl : 4 millimoles
         2 millimoles

$n_{Ca(OH)2}$ Reacting with 2 millimoles with CO_2

$n_{Ca(OH)2}$
      4
$V = \dfrac{4}{0.1} = 40 \ ml$

Question: Match the column and choose the correct option

	Column-I(Properties)		Column-II (Order)
A	Electronegativity	1	B < C < N < O
B	Cationic size	2	Li > Mg > Be
C	Metallic Character	3	K > Mg > Al

D	Electron affinity	4	Cl < F < Br < I

Options:
(a) A-1, B-2, C-3, D-4
(b) A-4, B-3, C-2, D-1
(c) A-2, B-3, C-4, D-1
(d) A-3, B-2, C-4, D-1
Answer: (a)

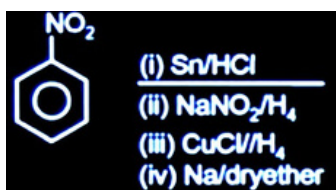Question: How many compounds have the linear shape OF_2, SO_2, $BeCl_2$, N_3^-, I_3^-, NO^+, $NO2$?
Options:
Answer: (4)

Question: Find molecular weight of A
Options:
Answer: (154)