

JEE-Main-22-01-2025 (Memory Based)

[MORNING SHIFT]

Chemistry

Question: What is the charge on metal and shape of complex of $[\text{NiCl}_4]^{2-}$ 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 > I
- (c) F > Cl > Br > I
- (d) Br > F > I > Cl

Answer: (c)

Question: Which of the following has maximum size out of Al^{3+} , Mg^{2+} , F^- , Na^+

Options:

- (a) Al^{3+}
- (b) Mg^{2+}
- (c) F^-
- (d) Na^+

Answer: (c)

Question: If the radius of the first orbit of the H atom is a_0 , then what is the radius of the first excited state of He^+ ion?

Options:

- (a) $\frac{a_0}{2}$
- (b) $2a_0$
- (c) a_0
- (d) $5a_0$

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) Eu^{3+}
- (b) Gd^{2+}
- (c) Eu^{2+}
- (d) Ce^{3+}

Answer: (c)

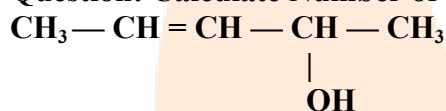
Question: The electrolysis product of which is $H_2S_2O_8$?

Options:

- (a) Dil H_2SO_4
- (b) $Cu SO_4(ag)$
- (c) Conc. H_2SO_4
- (d) None of these

Answer: (c)

Question: Calculate Number of stereoisomers of



Options:

- (a) 4
- (b) 2
- (c) 6
- (d) 8

Answer: (a)

Question: If $AlCl_3$ 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 = 27g/mol)

Options:

- (a) 0.1679
- (b) 0.2239
- (c) 0.3359
- (d) 0.4519

Answer: (c)

$$Q = I \times t = 2 \times 30 \times 60 = 3600 \text{ C.}$$

$$ne^- = \frac{Q}{F} = \frac{3600}{96500} \equiv 0.0373 \text{ mol } n_{Al} = \frac{0.0373}{3} = 0.0126 \text{ mol}$$

$$\text{wt of Al} = 0.0126 \times 27 = 0.335 \text{ g}$$

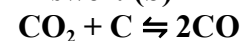
Question: $CO_2(g) + C(s) \rightleftharpoons 2CO(g)$

If initial pressure of CO_2 is 0.6 atm and after equilibrium is established, total pressure is 0.8 atm. Then, find K_p .

Options:

- (a) 0.8 atm
- (b) 0.4 atm
- (c) 0.5 atm
- (d) 0.2 atm

Answer: (b)



$$t = 0 \quad 0.6 \quad -$$

$$t = \quad 0.6 - x \quad - \quad 2x$$

$$\text{Given} \quad 0.6 - x = 2x = 0.8$$

$$0.6 + x = 0.8$$

$$x = 0.2$$

$$\therefore K_p = \frac{P_{\text{CO}}^2}{P_{\text{CO}_2}} = \frac{(0.4)^2}{(0.4)} = 0.4 \text{ atm}$$

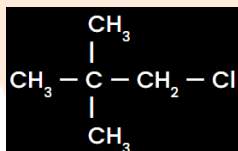
Question: In the Carius method of estimation of chlorine a compound of 180g produces 144g of AgCl. Find percentage composition of chlorine?

Options:

- (a) 20%
- (b) 36%
- (c) 23%
- (d) 25%

Answer: (a)

Question: Statement-1: $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{Cl}$ will show nucleophilic substitution by $\text{S}_\text{N}1$ mechanism in protic medium



Statement-2: will not undergo nucleophilic substitution via $\text{S}_\text{N}2$ 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), Δ_0 is zero for

Options:

- (a) $\text{K}_4[\text{FeC}(\text{N})_8]$
- (b) $\text{K}_3[\text{FeC}(\text{N})_6]$
- (c) $\text{K}_3[\text{FeF}_6]$
- (d) $\text{K}_2[\text{MnF}_6]$

Answer: (c)

$n \text{ K}_3[\text{FeF}_6]$ the e^- configⁿ = $t_2g^3 e_g^2$

$$\text{CFSE} = 0.4 \times t_2ge^- + 0.6e_g^-$$

$$= -0.4 \times 3 + 0.6 \times 2 = 0.$$

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.

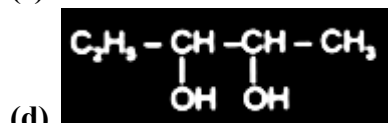
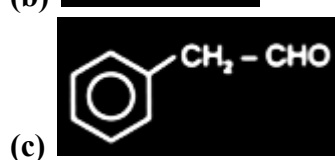
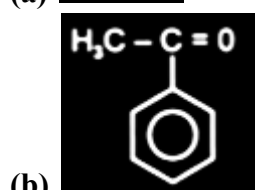
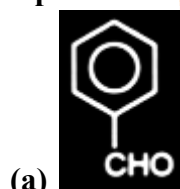
Options:

- (a) 6.28 \AA
- (b) 1.66 \AA
- (c) 3.32 \AA
- (d) 13.28 \AA

Answer: (a)

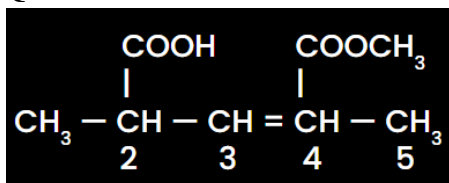
Question: Which will show a positive Fehling test?

Options:



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

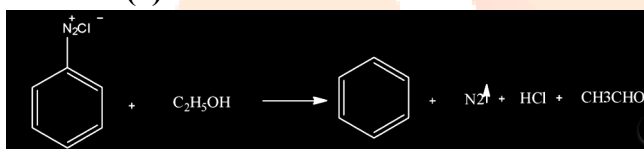
Answer: (a)

Question: When ethanol is treated with benzene diazonium chloride it 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 $\lambda = 500 \text{ nm}$. Which element will show photoelectric effect?

Options:

- (a) Caesium
- (b) Fransium
- (c) Both have same
- (d) None of the above

Answer: (a)

$$= E = \frac{12400}{\lambda(\text{\AA})} = \frac{12400}{5000} = 2.48 \text{ eV}$$

$$\text{KE} = h\nu - h\nu_0$$

$$h\nu > h\nu_0 \Rightarrow \text{Cs will show}$$

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) Eu^{3+} , (b) Eu^{2+} , (c) Gd^{3+} , (d) Tb^{3+} , (e) Sm^{2+}

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 0.1 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(OH)₂ is reacted with CO₂

Options:

- (a) 40 mL
 (b) 20 mL
 (c) 80 mL
 (d) 50 mL

Answer: (a)

$n_{\text{HCl}} : 4 \text{ millimoles}$

$n_{\text{Ca(OH)}_2} = 2 \text{ millimoles}$

$n_{\text{Ca(OH)}_2} = \text{Reacting with 2 millimoles with CO}_2$

$$V = \frac{4}{0.1} = 40 \text{ ml}$$

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	$\text{Cl} < \text{F} < \text{Br} < \text{I}$
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Options:

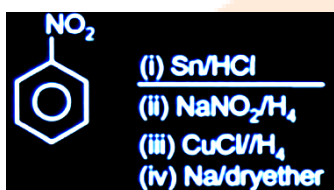
- (a) A-1, B-2, C-3, D-4
 (b) A-4, B-3, C-2, D-1
 (c) A-2, B-3, C-4, D-1
 (d) A-3, B-2, C-4, D-1

Answer: (a)

Question: How many compounds have the linear shape OF_2 , SO_2 , BeCl_2 , N_3^- , I_3^- , NO_2^+ , NO_2^- ?

Options:

Answer: (4)



Question: Find molecular weight of A

Options:

Answer: (154)