46 YEARS OF EXCELLENCE

NARAYANA EDUCATIONAL INSTITUTIONS

NARAYANA'S UNSTOPPABLE DOMINANCE

IN JEE MAIN 2024

ALL INDIA OPEN CATEGORY RANKS IN TOP 12

1 AIR	5 AIR	6 AIR	7 AIR	8 AIR	10 AIR	12 AIR
GAJARE NILKRISHNA App No. 240310385062 (DLP)	H VIDITH App No. 240310608827	MUTHAVARAPU ANOOP App No. 240310552251	M SAI TEJA App No. 240310661132	CHINTU SATEESH KUMAR App No. 240310213046	ARYAN PRAKASH App No. 240310099049	ROHAN SAI PABBA App No. 240310106660

JEE MAIN (JAN) 2025
22-01-2025 (9 AM-12 PM)

Memory - Based Question Paper

CHEMISTRY

JEE-Main-22-01-2025 (Memory Based) [SESSION-1]

CHEMISTRY

Question: What is the charge on metal and shape of complex of $[NiCl_4]^{2-}$ 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 > 1
(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) $5a_0$

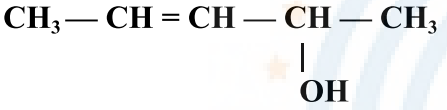
Answer: (b)

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

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 = 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.

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

wt of Al = 0.0124 × 27 = 0.335 g

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

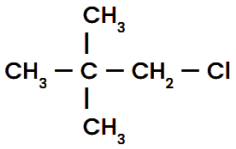
$CO_2 + C \leftrightharpoons 2CO$

t = 0	0.6	-
t =	0.6 - x	- 2x
Given	0.6 - x = 2x = 0.8	
	0.6 + x = 0.8	
	x = 0.2	

$$\therefore K_p = \frac{P_{CO^2}}{P_{CO_2}} = \frac{(0.4)^2}{(0.4)} = 0.4\,atm$$

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: CH_3 — O — CH_2 — Cl will show nucleophilic substitution by S_N1 mechanism in protic medium

Statement-2:  **will not undergo nucleophilic substitution via S_N2 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) K_4 [FeC(N)$_8$]
(b) K_3[FeC(N)$_6$]
(c) K_3[FeF_6]
(d) K_2[MnF_6]
Answer: (c)
n K_3[FeF_6] the e^- canfig^n = + tg^3 eg^2
CFSE = 0.4 × t_2ge^- + 0.6ege$^-$

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

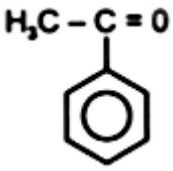
Question: Which of the following acids is present in a vitamin C ?
Options:
(a) Ascorbic acid
(b) Saccharic acid
(c) Aspartic acid
(d) Adipic acid
Answer: (a)

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)

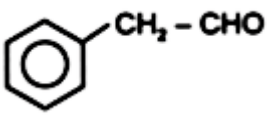
Question: An electron of He^+ is present in the 3rd excited state. Find its de-Broglie wavelength.
Options:
(a) 6.28Å
(b) 1.66 Å
(c) 3.32Å
(d) 13.28Å
Answer: (a)

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

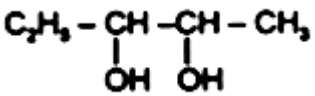
(b)



(c)

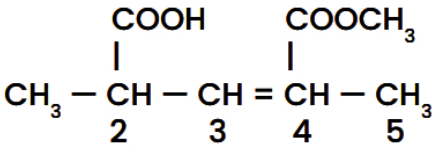


(d)



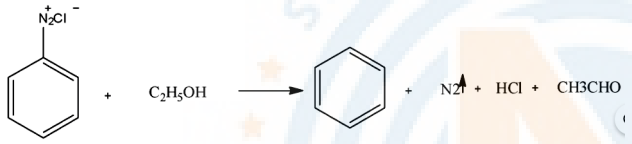
Answer: (c)

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)
$= E = \frac{12400}{\lambda(A°)} = \frac{12400}{5000} = 2.48eV$
KE = hv - hv_0
$h\nu > hv_0$ ⇒ 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	$5d^16s^2$	$5d^1$	$4f^0$
58	Cerium	Ce	$4f^15d^16s^2$	$4f^2$	$4f^1$
59	Praseodymium	Pr	$4f^36s^2$	$4f^3$	$4f^2$
60	Neodymium	Nd	$4f^46s^2$	$4f^4$	$4f^3$
61	Promethium	Pm	$4f^56s^2$	$4f^5$	$4f^4$
62	Samarium	Sm	$4f^66s^2$	$4f^6$	$4f^5$
63	Europium	Eu	$4f^76s^2$	$4f^7$	$4f^6$
64	Gadolinium	Gd	$4f^75d^16s^2$	$4f^75d^1$	$4f^7$
65	Terbium	Tb	$4f^96s^2$	$4f^9$	$4f^8$
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	$4f^{14}5d^16s^2$	$4f^{14}5d^1$	$4f^{14}$

Question: CO_2 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 $Ca(OH0_2$ is reacted with CO_2
Options:
(a) 40 mL
(b) 20 mL
(c) 80 mL
(d) 50 mL
Answer: (a)
n_{HCl} : 4 millimoles
$n_{Ca(OH)_2}$ **= 2 millimoles**
$n_{Ca(OH)_2}$ **= Reacting with 2 millimoles with CO_2**
$V = \frac{4}{0.1} = 40\,ml$

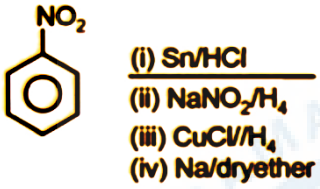
Question: Match the column and choose the correct option

	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^+_2, NO_2?
Options:
Answer: (4)



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