JEE-MAIN EXAM APRIL, 2025

Date: - 07-04-2025 (SHIFT-1)

CHEMISTRY

SECTION-A

1. At the sea level, the dry air mass percentage composition is given as nitrogen gas: 70.0, oxygen gas: 27.0 and argon gas: 3.0. If total pressure is 1.15 atm, then calculate the ratio of following respectively: (i) partial pressure of nitrogen gas to partial pressure of oxygen gas (ii) partial pressure of oxygen gas to partial pressure of argon gas (Given: Molar mass of N,O and Ar are 14, 16 and $40\,gmol^{-1}$ respectively.) (1) 2.96, 11.2(2) 2.59,11.85 (3) 4.26, 19.3 (4) 5.46, 17.82. Given below are two statements: Statement I: Ozonolysis followed by treatment with Zn, H₂O of cis-2-butene gives ethanal. Statement II: The product obtained by ozonolysis followed by treatment with Zn,H₂O of 3, 6dimethyloct-4-ene has no chiral carbon atom. In the light of the above statements, choose the correct answer from the options given below (1) Both Statement I and Statement II are False (2) Statement I is false but Statement II are true (3) Statement I is true but Statement II is false (4) Both Statement I and Statement II are true The number of valence electrons present in the metal among Cr, Co, Fe and Ni which has the lowest 3. enthalpy of atomisation is (1) 9(3) 10 (4) 6(2) 8An aqueous solution of HCI with pH 1.0 is diluted by adding equal volume of water (ignoring 4. dissociation of water). The pH of HCl solution would (Given log 2 = 0.30) (1) increase to 2 (2) increase to 1.3 (3) remain same (4) reduce to 0.5 5. Match the LIST-I with LIST-I LIST-I LIST-II Molecule/ion Bond pair : lone pair (on the central atom)

Α.	IC_2^-	I.	4:2
В.	H ₂ O	II.	4 : 1
C.	SO ₂	III.	2:3
D	XeF ₄	IV.	2:2

Choose the correct answer from the options given below:

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(1) A-III, B-IV, C-II, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-III, C-II, D-I

(4) A-II, B-I, C-IV, D-III



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6. Which of the following amine (s) show (s) positive carbylamine test?



Choose the correct answer from the options given below:

- (1) A and C Only (2) A and E Only (3) C Only (4) B, C and D Only
- 7. An octahedral complex having molecular composition $\text{Co.5NH}_3 \cdot \text{Cl}^2.\text{SO}_4$ has two isomers A and B. The solution of A gives a white precipitate with AgNO_3 solution and the solution of B gives white

precipitate with $BaCl_2$ solution. The type of isomerism exhibited by the complex is,

- (1) Co-ordinate isomerism
- (2) Ionisation isomerism
- (3) Linkage isomerism
- (4) Geometrical isomerism
- 8. Which of the following statements are correct, if the threshold frequency of caesium is 5.16×10^{14} Hz ?



- A. When Cs is placed inside a vacuum chamber with an ammeter connected to it and yellow light is focused on Cs, the ammeter shows the presence of current.
- B. When the brightness of the yellow light is dimmed, the value of the current in the ammeter is reduced.
- C. When a red light is used instead of the yellow light, the current produced is higher with respect to the yellow light.
- D. When a blue light is used, the ammeter shows the formation of current.
- E. When a white light is used. the ammeter shows formation of current.

Choose the correct answer from the options given below:

(1) A, B, D and E Only	(2) A, C, D and E Only			
(3) A, D and E Only	(4) B, C and D Only			



9. The group 14 elements A and B have the first ionisation enthalpy values of 708 and 715kJ mol⁻¹ respectively. The above values are lowest among their group members. The nature of their ions A²⁺ and B⁴⁺ respectively is

(1) oxidising and reducing
(2) both reducing
(3) reducing and oxidising
(4) both oxidising

10. Given below are two statements:

Statement I: Mohr's salt is composed of only three types of ions-ferrous, ammonium and sulfate.
Statement II: If the molar conductance at infinite dilution for ferrous, ammonium and sulfate ions are

 x_1, x_2 and $x_3 \operatorname{Scm}^2 \operatorname{mol}^{-1}$, respectively then the molar conductance for Mohr's salt solution at infinite

dilution would be given by $x_1 + x_2 + 2x_3$

In the light of the given statements, choose the correct answer from the options given below:

- (1) Statement I is true but Statement II are false
- (2) Both Statements I and Statement II are false
- (3) Both Statements I and Statement II are true
- (4) Statement I is false but Statement II is true
- 11. Total enthalpy change for freezing of 1 mol of water at 10° C to ice at -10° C is

(Given: $\Delta_{\text{fus}} \mathbf{H} = x \,\text{kJ} / \text{mol}$ $C_p [H_2 O(1)] = y \,\text{J} \,\text{mol}^{-1} \,\text{K}^{-1}$ $C_p [H_2 O(s)] = z \,\text{J} \,\text{mol}^{-1} \,\text{K}^{-1}$

(1) x - 10y - 10z (2) -10(100x + y + z) (3) 10(100x + y + z) (4) -x - 10y - 10z

12. A person's wound was exposed to some bacteria and then bacterial growth started to happen at the same place. The wound was later treated with some antibacterial medicine and the rate of bacterial decay(r) was found to be proportional with the square of the existing number of bacteria at any instance. Which of the following set of graphs correctly represents the 'before' and 'after' situation of the application of the medicine?

[Given: N = No. of bacteria, t = time, bacterial growth follows 1^{st} order kinetics.]

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13. Which of the following compounds is least likely to give effervescence of CO_2 in presence of aq.

NaHCO₃?



14. Reaction $A(g) \rightarrow 2B(g) + C(g)$ is a first order reaction. It was started with pure A

t/min	Pressure of system					
	at time t/mm Hg					
10	160					
8	240					

Which of the following option is incorrect?

- (1) Rate constant of the reaction is $1.693 \, \text{min}^{-1}$
- (2) The reaction never goes to completion
- (3) Partial pressure of A after 10 minute is 40 mm Hg
- (4) Initial pressure of A is 80 mm Hg
- **15.** Given below are two statements:

Statement I: Dimethyl ether is completely soluble in water. However, diethyl ether is soluble in water to a very small extent.

Statement II: Sodium metal can be used to dry diethyl ether and not ethyl alcohol.

In the light of given statements. choose the correct answer from the options given below

- (1) Both Statement I and Statement II are False
- (2) Both Statement I and Statement II are true
- (3) Statement I is true but Statement II is false
- (4) Statement I is false but Statement II are true
- 16. The first transition series metal ' M ' has the highest enthalpy of atomisation in its series. One of its aquated ion (M^{n+}) exists in green colour. The nature of the oxide formed by the above M^{n+} ion is:

(1) amphoteric (2) neutral

(3) basic

(4) acidic





Choose the correct answer from the options given below:



(1) A, C & D Only (2) B & E Only (3) B & D Only (4)



18. Which of the following is the correct IUPAC name of given organic compound (X) ?



(2) 4-Bromo-3-methylbut-2-ene

(3) 2-Bromo-2-methylbut-2-ene

(1) 1-Bromo-2-methylbut-2-ene

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(4) 3-Bromo-3-methylprop-2-ene
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- **19.** When a salt is treated with sodium hydroxide solution it gives gas X. On passing gas X through reagent Y a brown coloured precipitate is formed. X and Y respectively, are
 - (1) $X = NH_3$ and $Y = K_2HgI_4 + KOH$ (2) X = HCl and $Y = NH_4Cl$
 - (3) $X = NH_3$ and Y = HgO (4) $X = NH_4Cl$ and Y = KOH
- **20.** Given below are two statements:

Statement I: D-(+)-glucose + D-(+) fructose $\xrightarrow{-H_2O}$ Sucrose

sucrose $\xrightarrow{\text{hydrolysis}}$ D- (+) glucose + D-(+) fructose

Statement II: Invert sugar is formed during sucrose hydrolysis

In the light of the above statements, choose the correct answer from the options given below

- (1) Both Statement I and Statement II are False
- (2) Statement I is true but Statement II is false
- (3) Both Statement I and Statement II are true
- (4) Statement I is false but Statement II are true



SECTION-B

21. 1 Faraday electricity was passed through $Cu^{2+}(1.5M,1L)/Cu$ and 0.1 Faraday was passed through $Ag^{+}(0.2M,1L)/Ag$ electrolytic cells. After this the two cells were connected as shown below to make an electrochemical cell. The emf of the cell thus formed at 298 K is mV (nearest integer)



Given :

- 22. An organic compound weighing 500 mg, produced 220 mg of CO_2 , on complete combustion. The percentage composition of carbon in the compound is ___%. (nearest integer) (Given molar mass in gmol⁻¹ of C:12,O:16)
- **23.** The number of paramagnetic complexes among $[FeF_6]^3$, $[Fe(CN)_6]^3$, $[Mn(CN)_6]^3$, $[Co(C_2O_4)_3]^3$, $[MnCl_6]^3$, and $[CoF_6]^3$, which involved d^2sp^3 hybridization is
- 24. The percentage dissociation of a salt (MX_3) solution at given temperature (van't Hoff factor i=2) is _____%(Nearest integer)
- 25. Thyroxine, the hormone has given below structure



The percentage of iodine in thyroxine is ___%. (nearest integer) (Given molar mass in $gmol^{-1}C:12,H:1,O:16,N:14,I:127$)

NTA ANSWERS													
1.	(1)	2.	(3)	3.	(4)	4.	(2)	5.	(1)	6.	(1)	7.	(2)
8.	(1)	9.	(3)	10.	(1)	11.	(2)	12.	(2)	13.	(2)	14.	(1)
15.	(2)	16.	(3)	17.	(3)	18.	(1)	19.	(1)	20.	(4)	21.	(400)
22.	(12)	23.	(2)	24.	(33)	25.	(65)						

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