

JEE MAIN 31 JANUARY 2024 SHIFT 1 QUESTION PAPER

CHEMISTRY

1. Arrange the following elements (magnitude only) in the decreasing order of electron gain enthalpy.

Sulphur - A, Bromine - B, Fluorine - C, Argon - D

 Assertion(A): Noble gases have very high boiling points. Reason(R): Noble gases have strong dispersion forces. Hence, they liquefy at low temperatures and hence they have a high boiling point.
 i. Both A and R are true and R is the correct explanation of A.
 ii. Both A and R are true and R is not the correct explanation of A.
 iii. Both A and R are false.
 iv. A is true but R is false.
 Assertion: The pK value of phenol is 10.0 while that of ethanol is 15.9.

Reason: Ethanol is a stronger acid than phenol.

i. Both A and R are true and R is the correct explanation of A.

ii. Both A and R are true and R is not the correct explanation of A.

iii. Both A and R are false.

iv. A is true but R is false.

4. Find out the final product C for the reaction: **ACDIEVE**

 CH_3 - CH_2 - CH_2 - $Br \rightarrow$ (in presence of alcoholic KOH, heat) \rightarrow Product A

Product A \rightarrow (in presence of HBr) \rightarrow Product B

Product $B \rightarrow$ (in presence of aqueous KOH) \rightarrow Product C

- Find the total number of different alkanes formed when the following mixture is subjected to electrolysis (do not consider disproportionation reaction): CH₃COONa (aq) and C₂H₅COONa (aq)
- 6. How many of the following can be used as electrodes in batteries?

(i) Zinc

- (ii) Zinc Mercury amalgam
- (iii) Lead
- (iv) Graphite



- How many of the following compounds have sp³ hybridized central atom? H₂O, NH₃, SiO₂, SO₂, CO and BF₃
- How many of the following compounds have sp³ hybridized central atom?
 BF₃, BeCl₂, NH₃, CH₄, H₂O, SO₂, CO₂
- 9. How many of the following statements are true?
 - (i) Chromate ion is square planar.
 - (ii) Green manganate ion is diamagnetic.
 - (iii) Dichromate can be prepared using chromate.
 - (iv) Dark green KMnO4 disproportionates in acidic medium and neutral medium.

(v) For d-block elements, ionic character decreases for increasing oxidation number of metal in oxides.

- If one faraday of electricity is used in the discharging of Cu²⁺, then find the mass (in grams) of Cu deposited. (Round off the answer to the nearest integer.)
- 11. If the energy of radiation having a wavelength of 242 nm is X x 10^{-19} , then find the nearest integer value of X. Given: Planck's constant = 6.6×10^{-34} Js and c = 3×10^8 m/s.
- 12. Moles of CH_4 required for formation of 22 g of CO_2 is m x 10⁻². Find the value of m.

13. On which of the following factors does the electrical conductivity of an electrolytic cell does not depend?

i. Concentration of electrolyte

- ii. Amount of electrolyte added
- iv. Nature of electrode
- 14. Species having carbon with a sextet of valence electrons and acting as an electrophile is?
 - i. Carbanion
 - ii. Carbocation
 - iii. Free Radical
 - iv. Nitrene
- 15. The adsorption principle is used in
 - i. Distillation
 - ii. Differential Extraction
 - iii. Chromatography
 - iv. Vacuum Distillation



- 16. The spin-only magnetic moment of complex ion $[Ni(NH_3)_6]^{2+}$ is A x 10⁻¹ BM. Find the value of A.
- 17. Which of the following options contain amphoteric oxide(s) only?
 - i. SnO₂ and SiO ii. SiO₂
 - iii. SnO₂ and PbO₂
 - iv. CO and SiO
- 18. Which of the following solutions shows a positive deviation from Raoult's law?
 - i. $CHCl_3 + C_6H_6$
 - ii. CH₃COCH₃ + CS₂
 - iii. CH₃COCH₃ + CHCI₃
 - iv. $CH_3COCH_3 + C_6H_5NH_2$

19. Which of the following compounds is white in colour?

- i. ZnSO4
- ii. CuSO4
- iii. FeSO4

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