

JEE Main 2023 8 April Shift 1 Chemistry Question Paper

Time Allowed :180 minutes

Maximum Marks :300

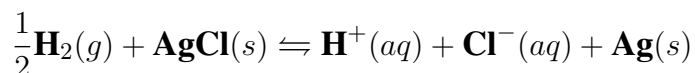
Total questions :90

General Instructions

Read the following instructions very carefully and strictly follow them:

- (A) The test is of 3 hours duration.
- (B) The question paper consists of 90 questions. The maximum marks are 300.
- (C) There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 30 questions in each part of equal weightage.
- (D) Each part (subject) has two sections.
 - (i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and –1 mark for wrong answer.
 - (ii) Section-B: This section contains 10 questions. In Section-B, attempt any five questions out of 10. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and –1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1: The reaction



occurs in which of the given galvanic cells?

- (A) Pt | H₂(g) | HCl(solⁿ) | AgNO₃(solⁿ) | Ag
 - (B) Pt | H₂(g) | HCl(solⁿ) | AgCl(s) | Ag
 - (C) Pt | H₂(g) | KCl(solⁿ) | AgCl(s) | Ag
 - (D) Ag | AgCl(s) | KCl(solⁿ) | AgNO₃ | Ag
-

2. Sulphur (S)-containing amino acids from the following are:

- (A) Isoleucine
- (B) Cysteine
- (C) Lysine
- (D) Methionine
- (E) Glutamic acid

Choose the correct answer from the following:

- (A) b, c, e
 - (B) a, d
 - (C) a, b, c
 - (D) b, d
-

3. Which of the following complex is octahedral, diamagnetic and the most stable?

- (1) K₃[Co(CN)₆]
 - (2) [Ni(NH₃)₆]Cl₂
 - (3) [Co(H₂O)₆]Cl₂
 - (4) Na₃[CoCl₆]
-

4. Which of the following metals can be extracted through alkali leaching technique?

- (1) Cu
- (2) Au
- (3) Pb
- (4) Sn

5. The correct order of spin-only magnetic moments for the following complex ions is:

- (1) $[\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-} < [\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-}$
 - (2) $[\text{Fe}(\text{CN})_6]^{3-} < [\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-} < [\text{Mn}(\text{CN})_6]^{3-}$
 - (3) $[\text{MnBr}_4]^{2-} < [\text{CoF}_6]^{3-} < [\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-}$
 - (4) $[\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-} < [\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-}$
-

6. The water gas on reacting with cobalt as a catalyst forms:

- (1) Methanoic acid
 - (2) Methanal
 - (3) Ethanol
 - (4) Methanol
-

7. The reaction:



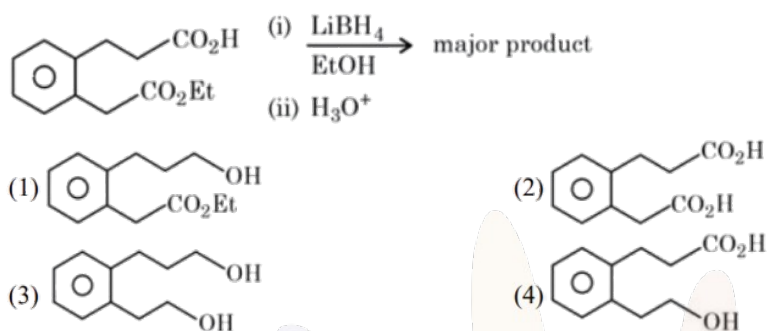
What is the value of x ?

- (1) 12
 - (2) 10
 - (3) 2
 - (4) 6
-

8. What is the purpose of adding gypsum to cement?

- (1) To give a hard mass
 - (2) To speed up the process of setting
 - (3) To facilitate the hydration of cement
 - (4) To slow down the process of setting
-

9. The major product formed in the following reaction is:



10. Match List I with List II:

List I (Species)	List II (Maximum Allowed Concentration in ppm in Drinking Water)
A. F^-	I. < 50 ppm
B. SO_4^{2-}	II. < 5 ppm
C. NO_3	III. < 2 ppm
D. Zn	IV. < 500 ppm

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

11. In chromyl chloride, the number of d-electrons present on chromium is the same as in:

(Given atomic numbers: Ti = 22, V = 23, Cr = 24, Mn = 25, Fe = 26)

- (1) Fe (III)
- (2) V (IV)
- (3) Ti (III)
- (4) Mn (VII)

12. Assertion-Reason:

Assertion (A): Butan-1-ol has a higher boiling point than ethoxyethane.

Reason (R): Extensive hydrogen bonding leads to stronger association of molecules.

(A) Both A and R are true, but R is not the correct explanation of A.

(B) Both A and R are true, and R is the correct explanation of A.

(C) A is false, but R is true.

(D) A is true, but R is false.

13. Match List I with List II:

List I (Reagents Used)	List II (Compound with Functional Group Detected)
A. Alkaline solution of copper sulphate and sodium citrate	I.
B. Neutral FeCl_3 solution	II.
C. Alkaline chloroform solution	III.
D. Potassium iodide and sodium hypochlorite	IV.

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

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

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

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

14. Match List I with List II:

List I (Reagent)	List II (Product)
A.	I.
B. HBF_4, Δ	II.
C. Cu, HCl	III.
D. CuCN/KCN	IV.

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

15. Match List I with List II:

List I	List II
A. Saccharin	I. High potency sweetener
B. Aspartame	II. First artificial sweetening agent
C. Alitame	III. Stable at cooking temperature
D. Sucralose	IV. Unstable at cooking temperature

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

16. The correct order of electronegativity for given elements is:

- (A) $P > Br > C > At$
(B) $C > P > At > Br$
(C) $Br > P > At > C$
(D) $Br > C > At > P$
-

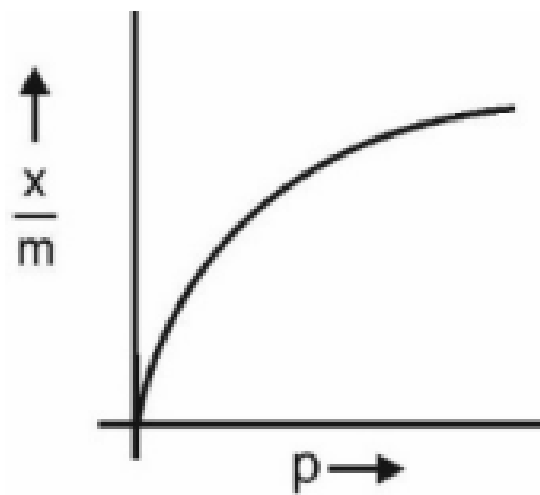
17. Given below are two statements:

Statement I: Lithium and Magnesium do not form superoxide.

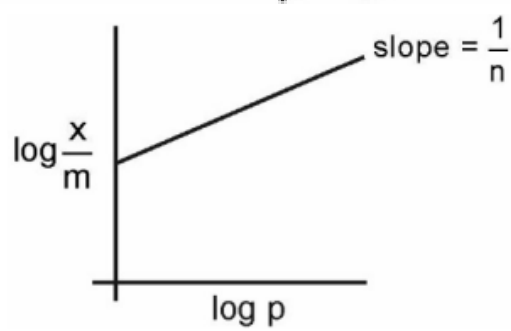
Statement II: The ionic radius of Li^+ is larger than the ionic radius of Mg^{2+} .

- (A) Statement I is correct, but Statement II is incorrect.
(B) Statement I is incorrect, but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.
-

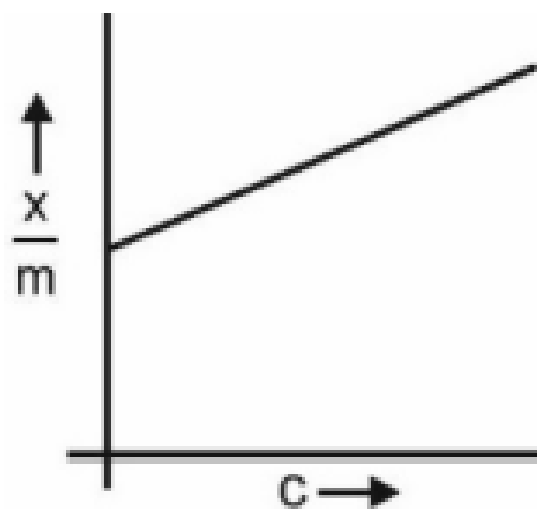
18. Which of the following represent the Freundlich adsorption isotherms?



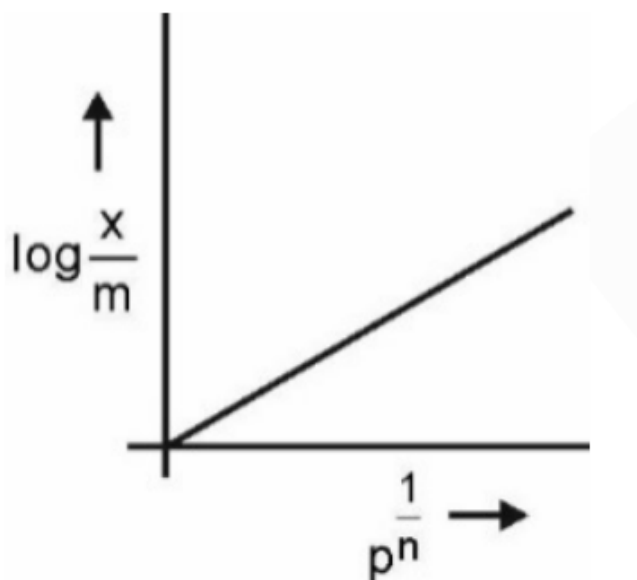
(A)



(B)



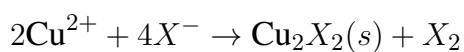
(C)



(D)

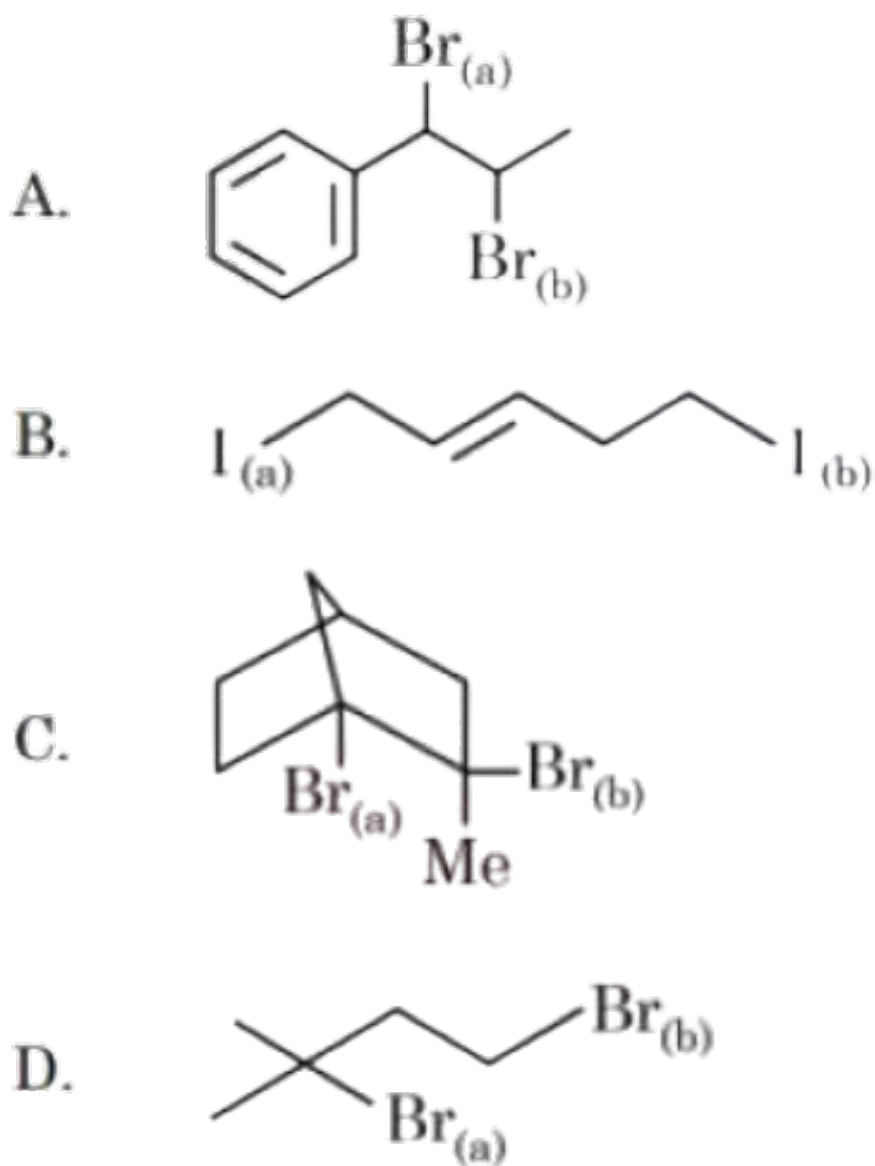
(A) A, C, D only (B) A, B only (C) A, B, D only (D) B, C, D only

19. Which halogen is known to cause the reaction given below:



- (A) All halogens
 - (B) Only chlorine
 - (C) Only bromine
 - (D) Only iodine
-

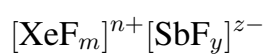
20. Choose the halogen which is most reactive towards $\text{S}_{\text{N}}1$ reaction in the given compounds (A, B, C, & D):



(A) A-Br(a); B-I(a); C-Br(b); D-Br(a) (B) A-Br(a); B-I(a); C-Br(a); D-Br(a) (C) A-Br(b); B-I(b); C-Br(b); D-Br(b) (D) A-Br(a); B-Br(a); C-Br(a); D-I(a)

21. Molar mass of the hydrocarbon (X) which on ozonolysis consumes one mole of O_3 per mole of (X) and gives one mole each of ethanol and propanone is:

22. XeF_4 reacts with SbF_5 to form:



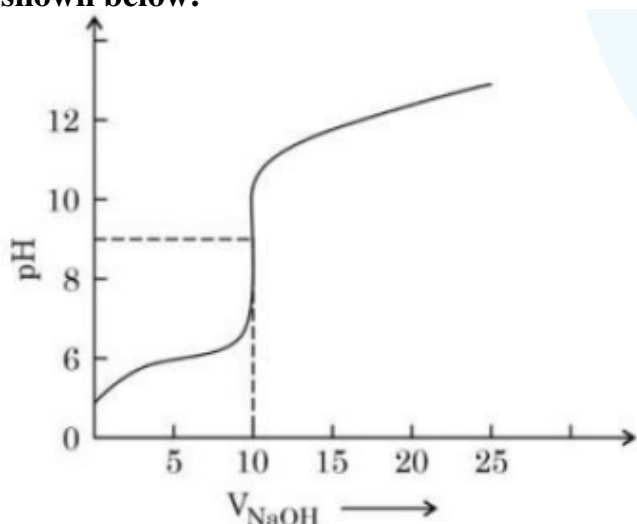
What is $m + n + y + z$?

- (A) 10
 - (B) 11
 - (C) 12
 - (D) 13
-

23. The number of following statements which is/are incorrect is:

- (A) Line emission spectra are used to study the electronic structure.
 - (B) The emission spectra of atoms in the gas phase show a continuous spread of wavelength from red to violet.
 - (C) An absorption spectrum is like the photographic negative of an emission spectrum.
 - (D) The element helium was discovered in the sun by spectroscopic method.
-

24. The titration curve of weak acid vs. strong base with phenolphthalein as indicator is shown below:



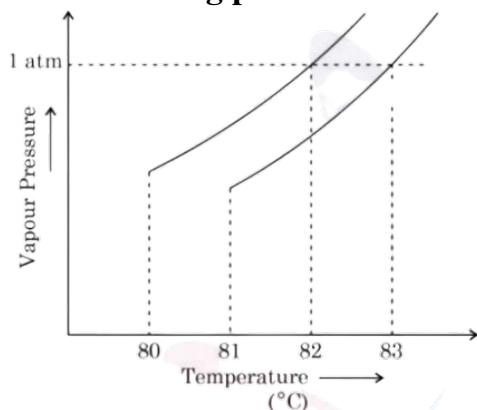
The $K_{\text{phenolphthalein}} = 4 \times 10^{-10}$ and $\log 2 = 0.3$. The number of correct statements about phenolphthalein is:

- (A) It can be used as an indicator for the titration of weak acid with weak base.
 - (B) It begins to change color at $\text{pH} = 8.4$.
 - (C) It is a weak organic base.
 - (D) It is colorless in acidic medium.
-

25. When a 60 W electric heater is immersed in a gas for 100 s in a constant volume

container with adiabatic walls, the temperature of the gas rises by 5°C . The heat capacity of the given gas is:

26. The vapor pressure vs. temperature curve for a solution-solvent system is shown below. The boiling point of the solvent is:



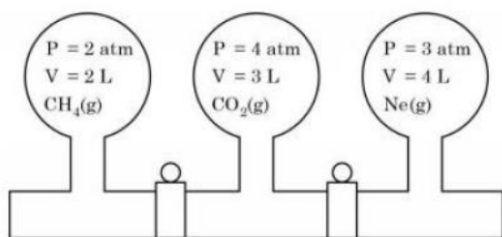
- (A) 81°C
 - (B) 82°C
 - (C) 83°C
 - (D) 84°C
-

27. 0.5 g of an organic compound (X) with 60% carbon will produce $\text{---} \times 10^{-1}$ g of CO_2 on complete combustion.

28. The number of following factors which affect the percent covalent character of the ionic bond is --- .

- (A) Polarising power of cation
 - (B) Extent of distortion of anion
 - (C) Polarisability of the anion
 - (D) Polarising power of anion
-

29. Three bulbs are filled with CH_4 , CO_2 , and Ne as shown in the picture. The bulbs are connected through pipes of zero volume. When the stopcocks are opened and the temperature is kept constant throughout, the pressure of the system is found to be --- atm. (Nearest integer)



30. The number of given statements/s which is/are correct is -----:

- (A) The stronger the temperature dependence of the rate constant, the higher is the activation energy.
- (B) If a reaction has zero activation energy, its rate is independent of temperature.
- (C) The stronger the temperature dependence of the rate constant, the smaller is the activation energy.
- (D) If there is no correlation between the temperature and the rate constant, then it means that the reaction has negative activation energy.
-