

JEE Main Chemistry Question Bank 2024

Question 1: The cation gives a bright red color with dimethyl glyoxime. Which is that cation?

- A. Cu^{2+}
- B. Ni^{2+}
- C. Zn^{2+}
- D. Co^{2+}

Answer (Option B)

Question 2: A 25 mL buffer solution is prepared by mixing CH_3COOH of concentration 0.1 M and CH_3COONa of concentration 0.01 M. If the pH of the solution is 5, then calculate the pK_a of CH_3COOH

- A. 4
- B. 5
- C. 6
- D. 7

Answer (Option C)

Question 3: The Correct statement about freons is

- A. They are used as a cancer medicine
- B. They are chlorofluorocarbon compounds
- C. These are toxic organic compounds
- D. These are flammable compounds

Answer (Option B)

Question 4: Statement 1: The freezing point of a solution decreases with a decrease in the amount of non-volatile solute.

Statement 2: The freezing point of the solution is less than that of the solvent.

- A. Statements 1 and 2 both are correct.
- B. State 1 is correct but statement 2 is incorrect
- C. Statement 1 is incorrect but Statement 2 is correct
- D. Statements 1 and 2 both are incorrect

Answer (Option 3)

Question 5: Predict the hybridization state of the central metal ion and magnetic nature of the complex $[Co(NH_3)_6]^{3+}$.

- A. sp^3d^2 , Paramagnetic
- B. sp^3d^2 , Diamagnetic
- C. d^2sp^3 , Paramagnetic
- D. d^2sp^3 , Diamagnetic

Answer (Option D)

Question 6: The number of Peptide bonds present in Tripeptide VAL – PRO – GLY is

- A. 1
- B. 2
- C. 3
- D. 4

Answer (Option B)

Question 7: Which one of the following is the correct decreasing order of the magnitude of Standard Reduction Potential of *Rb*, *Na* and *Li* in aqueous medium

- A. $Rb > Na > Li$
- B. $Li > Rb > Na$
- C. $Na > Rb > Li$
- D. $Li > Na > Rb$

Answer (Option B)

Question 8: Select the correct statement about physisorption

- A. Physisorption is highly specific
- B. Physisorption is always monolayer
- C. Physisorption doesn't require activation energy
- D. Physisorption is associated with very high enthalpy of adsorption

Answer (Option C)

Question 9:

Radius of 2nd orbit of Li²⁺ ion is x, radius of 3rd orbit of Be³⁺ will be

(1) $\frac{27x}{16}$

(2) $\frac{16x}{27}$

(3) $\frac{4}{3}x$

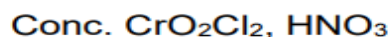
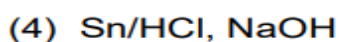
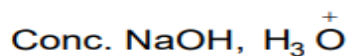
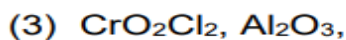
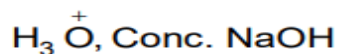
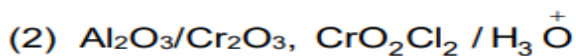
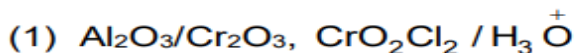
(4) $\frac{3}{4}x$

Answer (Option 1)

Question 9:

Identify the correct sequence of reagents for the following conversion.

n-Heptane $\rightarrow \rightarrow \rightarrow \rightarrow$ PhCOOH + PhCH₂OH



Answer (Option 1)

Question 10: Which of the following is correct about antibiotics.

- (1) Antibiotics are the substances that promote the growth of microorganism
- (2) Penicillin has bacteriostatic effect
- (3) Erythromycin has Bactericidal effect
- (4) These are synthesized artificially

Answer (Option 4)

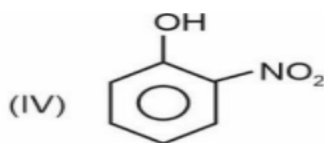
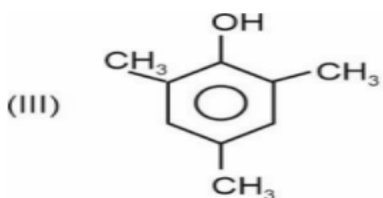
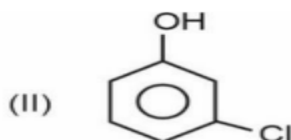
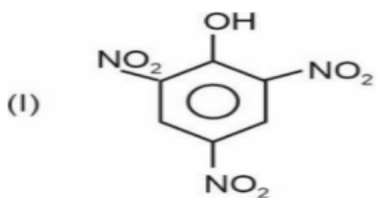
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Question 11: For a first order reaction A B, $1/2 t$ is 30 min.
Then find the time (in minutes) required for 75%
Completion of reaction

Answer (60.00)

Question 12:

Following compounds are given



Compare pK_a values

(1) I > IV > II > III

(2) I > IV > III > II

(3) III > II > IV > I

(4) IV > I > III > II

Answer (Option 3)

Question 13: Which of the following molecules has the highest bond dissociation energy?

- (1) I₂
- (2) F₂
- (3) Cl₂
- (4) Br₂

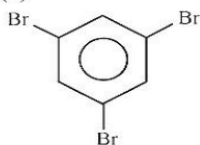
Answer (Option 3)

Question 14:

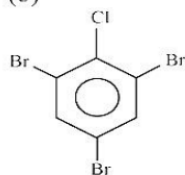
Question: Aniline on reaction with $\text{Br}_2 + \text{H}_2\text{O}$ then NaNO_2 and H_3PO_2 gives

Options:

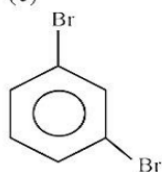
(a)



(b)



(c)



(d) None of these

Answer (Option A)



Question 15: Question: The spin-only magnetic moment of the compound _____

(a) 4.89

(b) 5.91

(c) 2.83

(d) 1.73

Answer (Option B)

Question 16: Which of the following species have carbonate ions?

(a) Washing Soda

(b) Caustic Soda

(c) Baking Soda

(d) All of the above

Answer (Option A)

Question 17:

Question: What is correct match?

Column I	Column II
A) BF_3	(i) See-saw
B) ClF_3	(ii) Square planar
C) XeF_4	(iii) T-shape
D) SF_4	(iv) Trigonal Planar

Options:

- (a) A \rightarrow (iv); B \rightarrow (iii); C \rightarrow (ii); D \rightarrow (i)
- (b) A \rightarrow (iii); B \rightarrow (i); C \rightarrow (ii); D \rightarrow (iv)
- (c) A \rightarrow (i); B \rightarrow (ii); C \rightarrow (iii); D \rightarrow (iv)
- (d) A \rightarrow (ii); B \rightarrow (iii); C \rightarrow (iv); D \rightarrow (i)

Answer (Option A)

Question 18: Which of the following structures of protein does not change its structure on heating?

- (a) Primary
- (b) Secondary
- (c) Quaternary
- (d) Tertiary

Answer (Option A)

Question 19: Which of the following is not copolymer?

- (a) Buna S
- (b) Neoprene
- (c) PHBV
- (d) Styrene butadiene

Answer (Option B)

Question 20: What is the product formed in the given reaction?

- (a) H_2O_2
- (b) H_2
- (c) No reaction
- (d) Both (a) and (b)

Answer (Option A)

Question 21: What's the most stable oxidation state of Co?

- (a) +2
- (b) +5
- (c) +6
- (d) +7

Answer (Option A)

Question 22: The product formed when LiAlH_4 reacts with BeCl_2

- (a) BeH_2
- (b) Be_2H_2
- (c) HCl
- (d) None

Answer (Option A)

Question 23: E and H represent the intensity of the electric field and magnetizing field respectively, then the unit of E/H will be:

- (A) ohm

- (B) mho
- (C) joule
- (D) newton

Answer (Option A)

Question 25: Find out the magnetic character of Li_2O , KO_2 and MgO in that order.

- (1) Diamagnetic, Paramagnetic and Diamagnetic
- (2) Paramagnetic, Paramagnetic and Diamagnetic
- (3) Diamagnetic, Paramagnetic and Paramagnetic
- (4) Diamagnetic, Diamagnetic and Diamagnetic

Answer (Option 1)

Question 26: A balloon carries a total load of 185 kg at normal pressure and temperature of 27°C . What load will the balloon carry on rising to a height at which the barometric pressure is 45 cm of Hg and the temperature is -7°C . Assuming the volume constant ?

- (A) 181.46 kg
- (B) 214.15 kg
- (C) 219.07 kg
- (D) 123.54 kg

Answer (Option D)

Question 27: A mass of 2kg suspended by a string of mass of 6kg. A wave of wavelength 6cm is produced at the bottom of the string. The wavelength of the wave at the top end of the string will be.

- (1) 6 cm
- (2) 18 cm
- (3) 12 cm
- (4) 24 cm

Answer (Option 3)

Question 28: A man of mass 80 kg is standing on the circumference of a disk of mass 200 kg. Disk is rotating about the vertical axis with an angular speed of 5 rev/second. Find the angular speed of the disk if the man reaches at the centre of the disk.

- (1) 3 rev/sec.
- (2) 6 rev/sec.
- (3) 9 rev/sec.
- (4) 12 rev/sec.

Answer (Option 3)

Question 29: Statement-I : The ionisation enthalpy difference from B to Al is more than that of Al to Ga. Statement-II: Ga has completely filled the d-orbital. Then, the correct option is?

- (1) Statement-I and Statement-II both are correct.
- (2) Statement I is incorrect and Statement II is correct.
- (3) Statement I is correct and Statement II is incorrect.
- (4) Statement-I and Statement-II both are incorrect.

Answer (Option 1)

Question 30: Which of the following is produced when propanamide is treated with Br_2 in the presence of KOH ?

- (1) Ethyl nitrile
- (2) Propanamine
- (3) Ethylamine
- (4) Propanenitrile

Answer (Option 3)

Question 31: During the qualitative analysis of -2SO_3 using dilute H_2SO_4 , SO_2 gas evolved which turns $\text{K}_2\text{Cr}_2\text{O}_7$ solution (acidified H_2SO_4)

- (1) Green
- (2) Black
- (3) Blue

(4) Red

Answer (Option 1)

Question 32: Speed of e^- in 7th orbit is 3.6×10^6 m/s then find the speed in 3rd orbit

(1) 3.6×10^6 m/s

(2) 8.4×10^6 m/s

(3) 7.5×10^6 m/s

(4) 1.8×10^6 m/s

Answer (Option 2)

Question 31: If the volume of an ideal gas is increased isothermally, then its internal energy

(1) Increased

(2) Remains constant

(3) Is decreased

(4) Can be increased or decreased

Answer (Option 2)

Question 32: Assertion: Ketoses gives the Seliwanoff test. Reason: Ketoses undergo - elimination to form furfural.

(1) Assertion and reason both are correct and reason is the correct explanation of assertion

(2) Assertion and reason both are correct but reason is not the correct explanation of assertion.

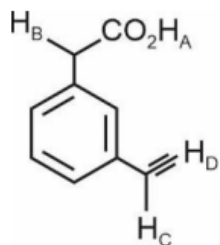
(3) Assertion is correct and reason is incorrect

(4) Assertion is incorrect but reason is correct.

Answer (Option 1)

Question 33:

Consider the following molecule



Select the correct order of acidic strength

- (1) $\text{H}_A > \text{H}_D > \text{H}_B > \text{H}_C$ (2) $\text{H}_B > \text{H}_A > \text{H}_D > \text{H}_C$
(3) $\text{H}_A > \text{H}_B > \text{H}_C > \text{H}_D$ (4) $\text{H}_C > \text{H}_B > \text{H}_D > \text{H}_A$

Answer (Option 1)

Question 34: Speed of e^- in 7th orbit is 3.6×10^6 m/s then find the speed in 3rd orbit

- (1) 3.6×10^6 m/s
(2) 8.4×10^6 m/s
(3) 7.5×10^6 m/s
(4) 1.8×10^6 m/s

Answer (Option 2)

Question 35: Arrange the following ligands according to their increasing order of field strength
 $2-2-S, \text{CO}, \text{NH}_3, \text{en}, \text{CO}$ 2 4 3

- (1) $2-2-S \text{ CO NH}_3 \text{ en C O}$ 3 2 4
(2) $2-2-S \text{ NH}_3 \text{ en CO C O}$ 3 2 4
(3) $2-2-S \text{ C O NH}_3 \text{ en CO}$ 2 4 3
(4) $2-2-\text{CO en NH}_3 \text{ C O S}$ 3 2 4

Answer (Option3)

Question 36: The role of SiO_2 in Cu extraction is

- (1) Converts FeO to FeSiO_3
(2) Converts CaO to CaSiO_3
(3) Reduces Cu_2S to Cu
(4) None of these

Answer (Option 1)

Question 37: The correct order of bond strength $\text{H}_2\text{O}, \text{H}_2\text{S}, \text{H}_2\text{Se}, \text{H}_2\text{Te}$

- (1) $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$
- (2) $\text{H}_2\text{S} > \text{H}_2\text{O} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$
- (3) $\text{H}_2\text{Te} > \text{H}_2\text{Se} > \text{H}_2\text{S} > \text{H}_2\text{O}$
- (4) $\text{H}_2\text{Te} > \text{H}_2\text{S} > \text{H}_2\text{O} > \text{H}_2\text{Se}$

Answer (Option 1)

Question 38: The BOD value of a water sample is 3 ppm. Select the correct option about the given sample of water.

- (1) It is highly polluted water
- (2) It is clean water
- (3) The concentration of oxygen in the given sample is much less
- (4) None of these

Answer (Option 2)

Question 39: Boric acid is present in the solid state while BF_3 is a gas at room temperature because

- (1) Hydrogen bonding is present in boric acid
- (2) Boric acid has more molar mass as compared to BF_3
- (3) BF_3 is polymeric in nature
- (4) Both (2) and (3)

Answer (Option 1)

Question 40: Which of the following equation is correct?

- (1) $\text{LiNO}_3 \rightarrow \text{Li} + \text{NO}_2 + \text{O}_2$
- (2) $\text{LiNO}_3 \rightarrow \text{LiNO}_2 + \text{O}_2$
- (3) $\text{LiNO}_3 \rightarrow \text{Li}_2\text{O} + \text{NO}_2 + \text{O}_2$
- (4) $\text{LiNO}_3 \rightarrow \text{Li}_2\text{O} + \text{N}_2\text{O}_4 + \text{O}_2$

Answer (Option 3)