

CBSE Class 12 Chemistry 2019 - Set 56-1-1 - Compartment



Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This question paper contains 27 questions. All questions are compulsory.
- (ii) Section A : Questions number 1 to 5 are very short answer questions and carry 1 mark each.
- (iii) Section B : Questions number 6 to 12 are short answer questions and carry 2 marks each.
- (iv) Section C : Questions number 13 to 24 are also short answer questions and carry 3 marks each.
- (v) Section D : Questions number 25 to 27 are long answer questions and carry 5 marks each.
- (vi) There is no overall choice. However, an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- (vii) Use of log tables, if necessary. Use of calculators is not allowed.

Questions

1. What is tincture of iodine? What is its use?

2(a). Predict the number of unpaired electrons in the square planar $[\text{Pt}(\text{CN})_4]^{2-}$ ion.

OR

2(b). Amongst $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ and $[\text{Fe}(\text{NH}_3)_6]^{3+}$ which is more stable and why?

3(a). Draw the structure of semicarbazone of cyclopentanone.

OR

3(b). Draw the structure of product formed when propanal is treated with zinc amalgam and concentrated hydrochloric acid.

4. Name a carbohydrate present in liver, muscles and brain.

5. Draw structure for the polymer used for manufacture of non-stick utensils.

6. Define conductivity and molar conductivity for the solution of an electrolyte. Why does the conductivity of solution decrease with dilution?

7. For a reaction, $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2(\text{g}) \rightarrow \text{C}_2\text{H}_6(\text{g})$,
 $\text{rate} = 5.5 \times 10^{-14} [\text{C}_2\text{H}_4]$.

(a) Write the unit of rate constant.

(b) Calculate its half-life ($t_{1/2}$).

8. (a) Draw the structure of an oxide of nitrogen where the oxidation state of nitrogen is +5.

(b) With the help of a balanced chemical equation, suggest what happens when white phosphorus reacts with NaOH solution in an inert atmosphere.

9. (a) Actinoid contraction is greater than lanthanoid contraction. Give reason.

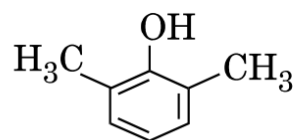
(b) Out of Fe and Cu, which has higher melting point and why?

10(a). Predict the major product obtained when t-butyl bromide reacts with sodium methoxide. Also, give its IUPAC name.

OR

10(b). (a) Show the chemical reaction with bond movements and arrows for the nucleophilic attack of water on carbocation in acid catalysed hydration of alkenes.

(b) Give IUPAC name for the following:



11(a). Aluminium crystallises in a fcc structure. Atomic radius of the metal is 125 pm. What is the length of the side of unit cell of the metal?

OR

11(b). The compound CuCl has fcc structure like ZnS. Its density is 3.04 g cm^{-3} . What is the volume of unit cell?

Given: Atomic mass of Cu = 63.5 u; Cl = 35.5 u;
 $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$

12. Answer the following:

(a) What is the formula of a compound in which element Y forms ccp lattice and atoms X occupy $\frac{1}{3}$ rd of tetrahedral voids?

(b) What type of non-stoichiometric point defect leads to colour in alkali metal halides?

13. Zinc rod is dipped in 0.01 M solution of zinc sulphate when temperature is 298 K. Calculate the electrode potential of zinc.

(Given: $E^\circ_{(Zn^{2+}/Zn)} = -0.76$ V; $\log 10 = 1$)

14. The rate constant of a first order reaction increases from 2×10^{-2} to 6×10^{-2} when the temperature changes from 300 K to 320 K. Calculate the energy of activation.

(Given: $\log 2 = 0.3010$, $\log 3 = 0.4771$, $\log 4 = 0.6021$)

15(a). Answer the following:

(a) Why is ester hydrolysis slow in the beginning and then becomes faster after some time?

(b) In a solution of methylene blue, animal charcoal is added, the solution is then well shaken. What will be observed and why?

(c) Give an example of oil in water emulsion.

OR

15(b). Define the following:

(a) Associated colloids

(b) Electrophoresis

(c) Zeta potential

16(a). (a) What is the difference between calamine and malachite?

(b) Why is zinc used instead of Cu for recovery of Ag from $[Ag(CN)_2]^-$?

(c) What is the role of cryolite in metallurgy of Al?

OR

16(b). (a) Give two points of differences between pig iron and cast iron.

(b) Outline the principle of zone refining.

17. (a) Complete the following chemical reactions:

(i) $Na_2Cr_2O_7 + KCl \rightarrow$

(ii) $MnO_4^- + 2SO_3^{2-} + 6H^+ \rightarrow$

(b) How does the colour of $Cr_2O_7^{2-}$ change when treated with an alkali?

18(a). (a) Draw the structures of geometrical isomers of $[Fe(NH_3)_2(CN)_4]^-$.

(b) $[NiCl_4]^{2-}$ is paramagnetic while $[Ni(CO)_4]$ is diamagnetic though both are tetrahedral. Why? [Atomic number of Ni = 28]

OR

18(b). Define the following:

(a) Ambidentate ligands

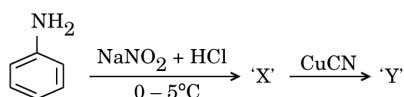
(b) Spectrochemical series

(c) Heteroleptic complexes

19. (a) Write the product formed when
(i) 2-chloropropane is treated with alc. KOH.
(ii) Aniline reacts with conc. H_2SO_4 at 453-473 K.
(b) When aniline is heated with CHCl_3 and alc. KOH, a foul smelling compound is formed. What is this compound?

20. (a) How will you convert the following:
(i) Phenol to benzoquinone
(ii) Propanone to 2-methyl propan-2-ol
(b) Why does propanol have higher boiling point than that of butane?

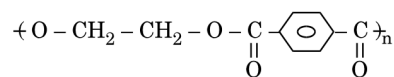
21. (a) Identify X and Y in the following:



- (b) Amino group is o, p-directing for aromatic electrophilic substitution reactions. Why does aniline on nitration give m-nitroaniline?

22. (a) What happens when D-glucose is treated with the following reagents:
(i) HI
(ii) conc. HNO_3
(b) What is the basic structural difference between starch and cellulose?

23. (a) Write the names of monomers of following polymer:



- (b) What does part 6,6 mean in the polymer Nylon-6,6?
(c) Give an example of Biodegradable polymer.

- 24(a). (a) Differentiate between antiseptic and disinfectant. Give one example of each.
(b) Why do we require artificial sweetening agents?

OR

- 24(b). Define the following terms:

- (a) Tranquilizers
(b) Antacids
(c) Analgesics

- 25(a). (a) A 5% solution (by mass) of cane sugar in water has a freezing point of 271 K. Calculate the freezing point of 5% solution (by mass) of glucose in water. The freezing point of pure water is 273.15 K.
(b) Why is osmotic pressure of 1 M KCl higher than 1 M urea solution?
(c) What type of liquids form ideal solutions?

OR

25(b). (a) 1.0 g of a non-electrolyte solute dissolved in 50 g of benzene lowered the freezing point of benzene by 0.40 K. The freezing point depression constant of benzene is $5.12 \text{ K kg mol}^{-1}$. Find the molar mass of the solute.

(b) What is the significance of Henry's law constant, K_H ?

(c) What leads to anoxia?

26(a). A crystalline solid 'A' burns in air to form a gas 'B' which turns lime water milky. The gas is also produced as a by-product during roasting of sulphide ore. This gas decolourises acidified KMnO_4 (aq.) solution and reduces Fe^{3+} to Fe^{2+} . Identify 'A' and 'B' and write the reactions involved.

OR

26(b). Answer the following:

(a) Arrange the following hydrides of Group 16 elements in the decreasing order of their acidic strength: H_2O , H_2S , H_2Se , H_2Te

(b) Which one of PCl_4^+ and PCl_4^- is not likely to exist and why?

(c) Which allotrope of sulphur is thermally stable at room temperature?

(d) Write the formula of a compound of phosphorus which is obtained when conc. HNO_3 oxidises P_4 .

(e) Why does PCl_3 fume in moisture?

27(a). (a) An organic compound with the molecular formula $\text{C}_7\text{H}_6\text{O}$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On oxidation, it gives benzoic acid. Identify the compound and state the reactions involved.

(b) Give chemical tests to distinguish between the following pair of compounds:

(i) Phenol and propanol

(ii) Benzoic acid and benzene

OR

27(b). (a) Predict the products of the following:

$\text{CH}_3\text{CH}_2\text{OH} \rightarrow (\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4)$ A $\rightarrow (\text{SOCl}_2)$ B $\rightarrow (\text{NH}_3)$ C $\rightarrow (\text{NaOBr})$ D

(b) Arrange the following in their increasing acidic character: HCOOH , CF_3COOH , ClCH_2COOH , CCl_3COOH

- End of Question Paper -