

CBSE Question Paper 2019 (Set-1)
Class 11 Chemistry
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Time: 3 hours

MM 60

GENERAL INSTRUCTIONS:

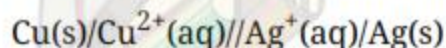
- i. All Questions are compulsory
- ii. Question no. 1 are very short answer questions and carry 1 marks each.
- iii. Question 6 to 14 are short answer questions and carry 2 marks each.
- iv. Question no 15 to 23 are also short answer questions and carry 3 marks each.
- v. Question no 24 and 25 are long answer questions and carry 5 marks each.
- vi. Use log table if necessary.

1. What is the formula of a compound in which element Y forms ccp lattice and atoms of X occupy $\frac{1}{3}$ rd of the octahedral voids?
2. Why do alkali metals give blue colour when dissolved in liquid ammonia?
3. On heating a crystal of KCl in potassium vapours, the crystal starts exhibiting a violet colour. What is this due to?
4. State the second law of thermodynamics.

OR

When 430 J of work was done on a system, it lost 120 J of energy as heat. Calculate the value of Internal energy change for the process.

5. Give the complete redox reaction for the cell representation:



6. The density of 1M solution of NaCl is 1.25 g ml^{-3} . Calculate the molality of the solution (NaCl = 58.5).
7. Write the electronic configuration of Cr^{-1} and Sc^{+1} Ionic species. (Cr = 24, Sc = 21).
8. Calculate the velocity of a particle of mass 0.1mg which is associated with a wavelength of $3.3 \times 10^{-29} \text{ m}$ ($h = 6.6 \times 10^{-34} \text{ M kg m}^2 \text{ s}^{-1}$)

9. Give the molecular orbital configuration of N_2^+ and O_2^{2-} (At. No. O = 8, N = 7)

OR

Give the shapes of the following molecules:

PCl_5 , SF_6 , BeF_2 , NH_4^+ (At. No. P = 15, S = 16, Cl = 17, F = 9, Be = 4, N = 7, H = 1)

10. Arrange the following in decreasing order of ionic character of the bond and give reasons
 $NaCl$, NaF , $NaBr$ and NaI
11. Calculate the pH of 0.4 gm of $NaOH$ dissolved in water to give 200 ml of solution. ($NaOH = 40$ g)

OR

Determine the solubility of Silver chromate, K_{sp} of $Ag_2CrO_4 = 1.1 \times 10^{-12}$.

12. How would you explain the following:
- LiI is more soluble in ethanol than KI .
 - A solution of sodium carbonate is alkaline. why?
13. Account for the following (any two):
- Boron halides do not dimerise like boron hydride.
 - $PbCl_4$ is a good oxidizing agent.
 - $SiCl_4$ can be easily hydrolysed by water but CCl_4 does not.
14. What happens when (give equations) (any two):
- Borax is heated strongly.
 - B_2H_6 is reacted with ammonia.
 - Aluminium is treated with dilute $NaOH$.
15. Give reasons for the following:
- Halogens acts as good oxidizing agents.
 - Electron gain enthalpy of noble gas is almost zero.
 - Na and Mg^+ has same number of electrons but removal of electron from Mg^+ requires more energy.
16. An element occurs in bcc structure. It has a cell edge length of 250 pm. Calculate the molar mass if its density is 8.0 gm cm^{-3} . Also, calculate the radius of an atom of this element.

OR

Niobium crystallizes in bcc structure of the density 8.6 g/cm^3 . Calculate the atomic radius of niobium using atomic mass = 93μ .

17. Calculate the enthalpy change for the process $\text{CCl}_4(\text{g}) \rightarrow \text{C}(\text{g}) + 4\text{Cl}(\text{g})$ and calculate bond enthalpy of C-Cl in $\text{CCl}_4(\text{g})$.

$$\Delta_{\text{vap}}H^\circ(\text{CCl}_4) = 30.5 \text{ kJ mol}^{-1}$$

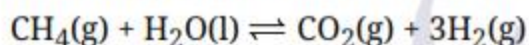
$$\Delta_f H^\circ(\text{CCl}_4) = -135.5 \text{ kJ mol}^{-1}$$

$$\Delta_a H^\circ(\text{C}) = 715.0 \text{ kJ mol}^{-1}.$$

$$\Delta_a H^\circ(\text{Cl}_2) = 242 \text{ kJ mol}^{-1}, \text{ where } \Delta_a H^\circ \text{ is enthalpy of atomisation}$$

18. Calculate the bond energy of C - H bond if $\Delta H^\circ_{\text{combustion}}$ of $\text{CH}_4 = -891.6 \text{ kJ mol}^{-1}$, ΔH of C(s) is 394 kJ mol^{-1} , ΔH of H_2 is -286 kJ mol^{-1} . heat of sublimation of C(s) is 717 kJ mol^{-1} , heat of dissociation of H_2 is 416 kJ mol^{-1} .

19. Dihydrogen gas is obtained from natural gas by partial oxidation with steam as per following endothermic reaction:



- Write an expression of K_c for the above reaction
 - How will the value of K_c and composition of equilibrium mixture be affected by
 - Increasing pressure
 - increasing temperature
 - adding a catalyst
 - adding an inert gas
20. Balance the following redox reaction by ion electron method:
- $\text{MnO}_4^- + \text{I}^- \rightarrow \text{MnO}_4 + \text{I}_2$ (in basic medium)
 - $\text{Cr}_2\text{O}_7^{2-} + \text{SO}_2 \rightarrow \text{Cr}^{3+} + \text{HSO}_4^-$ (in acidic medium)
21.
 - Name the class of hydrides to which water and sodium hydride belong.
 - Give the names of different types of molecular hydrides.
 - Explain the term hydride gas.
22. Explain the following terms with suitable examples:

1. Metamerism
2. Electromeric Effect
3. R(Resonance)

23. Give reasons. (Give chemical equations to support your answer)

- i. Alkynes are acidic in nature.
- ii. What happens when 2 - bromobutane is treated with alcoholic KOH.
- iii. Effect of branching of an alkane on its boiling point.

OR

Explain the following with suitable examples:

- i. Saytzeff's Rule
- ii. Markovnikov's Rule
- iii. β -Elimination Reaction

24. Explain the following reaction:

OR

What happens when(give chemical equations)

- i. Wurtz reaction
- ii. Freidal Crafts Reaction
- iii. Decarboxylation
- iv. Kolbe's Electrolysis
- v. Nitration in Benzene
- vi. Benzene is reacted with chlorine in the presence of anhydrous AlCl_3 .
- vii. Pent-2-ene is reacted with O_3 and the product is treated with $\text{Zn}/\text{H}_2\text{O}$.
- viii. Propyne is treated with Fe at 873 K.
- ix. Methane is reacted with oxygen in the presence of Mo_2O_3 .
- x. Ethyne is hydrolysed in the presence of $\text{HgSO}_4/\text{H}_2\text{SO}_4$.

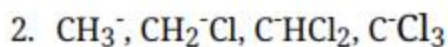
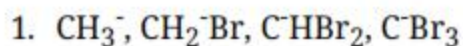
25. Give the condensed and bond - line structural formulae of the following:

- i. 2-hydroxy-1,2,3-propanetricarboxylic acid
- ii. Hexanedial
- iii. 2-(4-isobutylphenyl)propionic acid
- iv. 2-hydroxy-1,2-diphenylethan-1-one

v. 4-phenylbut-2-anal

OR

1. Identify the most stable species in the following ions and give reasons:



2. Arrange the following in order of increasing acidic strength giving reasons:

