

## ANNUAL PRACTICE PAPER

CLASS : XII            SET : III            MAX.MARKS : 70

SUBJECT : CHEMISTRY            TIME : 3 Hrs.

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(P-BLOCK ELEMENTS, d & f - BLOCK ELEMENTS, CO-ORDINATION COMPOUNDS)

### General Instructions:

1. All Questions are compulsory.
2. Marks for each question are indicated against it.
3. Question number 1 to 8 are very short answer questions and carry 1 mark each.
4. Question number 9 to 18 are short answer questions and carry 2 marks each.
5. Question number 19 to 27 are also short answer questions and carry 3 marks each.
6. Question number 28 to 30 are long answer questions and carry 5 marks each.
7. There will be no overall option. Internal choice is given for all three 5 marks questions.
8. Use log table if necessary, use of calculator is not permitted.

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1. Which halogen cannot show an oxidation state of +1?
  2. Why does ozone act as a powerful oxidizing agent?
  3. What is the basicity of  $\text{H}_3\text{PO}_4$  ?
  4. Nitrogen exists as diatomic molecule  $\text{N}_2$  , whereas phosphorous exists as tetratomic molecule  $\text{P}_4$ .  
explain .
  5. Which three elements belonging to *d*-block are usually not considered as transition elements ?
  6.  $\text{Ti}^{3+}$  salts are coloured while  $\text{Sc}^{3+}$  salts are colorless .Explain
  7. Draw the geometry of  $\text{trans-}[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ .
  8. Name the ionization isomer of  $[\text{Cr}(\text{H}_2\text{O})_5\text{Br}]\text{SO}_4$ .
  9.  $[\text{NiCl}_4]^{2-}$  is paramagnetic while  $[\text{Ni}(\text{CO})_4]$  is diamagnetic though both are tetrahedral . Why ?

10. Explain why (i) cuprous chloride ( $\text{CuCl}$ ) is colourless while cupric chloride ( $\text{CuCl}_2$ ) is blue  
(ii)  $\text{TiCl}_3$  is coloured while  $\text{TiCl}_4$  is colourless?
11. Write down the electronic configuration of the following ions  
(a)  $\text{Cu}^+$       (b)  $\text{Mn}^{2+}$
12. Write two uses each of  
(a) Lanthanoids      (b) Actinoids
13. What happens when?  
(a) Conc.  $\text{H}_2\text{SO}_4$  is added to  $\text{CaF}_2$ .  
(b)  $\text{SO}_3$  is passed through water.
14. Name two compounds in which oxygen has oxidation state different from -2.  
Give oxidation states also.
15. Describe the molecular shapes of the following  
(a)  $\text{SF}_4$       (b)  $\text{IF}_3$
16. Describe the chemical reaction of chlorine with  
(i) Anhydrous Calcium hydroxide (Slaked lime)  
(ii) Aqueous solution of hot Calcium hydroxide (Milk of lime)
17. Write the correct formula for the following co-ordination compounds  
(a)  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$  (Violet, with three chloride ions/unit formula)  
(b)  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$  (Dark green colour, with one chloride ion/unit formula)
18. Give IUPAC Name and draw the structure of  $[\text{Fe}(\text{CO})_5]$
19. Using the valence bond approach, predict the hybridization, shape and magnetic character of  $[\text{Co}(\text{NH}_3)_6]^{3+}$ . (Atomic number of Co=27)
20. Write the formula for Complex Species whose IUPAC names are given below  
(a) Potassium hexacyano cobaltate (III)  
(b) Nitro penta ammine cobalt (III) nitrate  
(c) Copper (III) hexacyano ferrate (II).
21. Discuss the role of complex compounds in the following area

- (i) Electro plating            (ii) softening of water            (iii) In living system

22. Give the electronic configuration of the

- (i) *d*-orbitals of Ti in  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  ion in an octahedral crystal field.  
(ii) Why is this complex coloured? Explain on the basis of distribution of electrons in the *d*-orbitals.  
(iii) How does the colour change on heating  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  ion.

23. Explain giving reason

- (a) Transition metals and many of their compounds show paramagnetic behavior.  
(b) The enthalpies of atomization of the transition metals are high.  
(c) Transition metals and their many compounds act as good catalysts.

24. Calculate the number of unpaired electrons in following gaseous ions:  $\text{Mn}^{2+}$ ,  $\text{Cr}^{3+}$  and  $\text{Ti}^{4+}$

25. Explain the following

- (a) Covalent fluorides are more inert than other halides?  
(b) Noble gases form compounds with fluorine and oxygen only but not with bromine and iodine.  
(c) Fluorine is a stronger oxidizing agent than chlorine.

26. Give shapes of the following molecules

- (i)  $\text{XeOF}_2$     (ii)  $\text{XeOF}_4$     (iii)  $\text{XeO}_3$

27. Find the oxidation state of the halogens in the following compounds:

- (a)  $\text{Cl}_2\text{O}$     (b)  $\text{KBrO}_3$     (c)  $\text{ClO}_2^{-1}$

28. Write the Balanced equations for the following reactions:

- (a)  $\text{Ca}_3\text{P}_2 + \text{H}_2\text{O} \longrightarrow$   
(b)  $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \longrightarrow$   
(c)  $\text{P}_4 + \text{KOH} + \text{H}_2\text{O} \longrightarrow$   
(d)  $\text{Cu} + \text{Conc. H}_2\text{SO}_4 \longrightarrow$   
(e)  $\text{H}_2\text{S} + \text{SO}_2 \xrightarrow{\text{catalyst}} \longrightarrow$

(OR)

Arrange the following in the order of property indicated for each set:

- a)  $F_2, Cl_2, Br_2, I_2$  -- increasing bond energy
- b)  $HF, HCl, HBr, HI$  -- increasing acid strength
- c)  $NH_3, PH_3, AsH_3, SbH_3, BiH_3$  -- increasing base strength
- d)  $H_2O, H_2S, H_2Se, H_2Te$  -- increasing acid strength
- e)  $HClO_4, HClO_3, HClO_2, HClO$  -- increasing oxidizing power

29. Write balanced equations for the following:

- a)  $NaCl$  is heated with sulphuric acid in the presence of  $MnO_2$
- b) Chlorine gas is passed into a solution of  $NaI$  in water
- c)  $SiO_2$  is treated with  $HF$
- d)  $NaClO_2$  is treated with  $SO_2$
- e) Iodine is treated with  $Conc.HNO_3$

OR

Describe the manufacture of  $H_2SO_4$  by contact process using equations, favorable conditions and labeled diagram

30. What happens when?

- (a)  $KMnO_4$  is heated
- (b)  $K_2Cr_2O_7$  is heated
- (c)  $KI$  Solution is treated with alkaline solution of  $KMnO_4$
- (d)  $SO_2$  is passed through acidified solution of  $K_2Cr_2O_7$
- (e)  $K_2Cr_2O_7$  is dissolved in  $KOH$  solution

OR

- (a) Describe the preparation of potassium dichromate from chromite ore
- (b) Describe the structure of
  - (i) dichromate ion
  - (ii) chromate ion
  - (iii) manganate ion

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