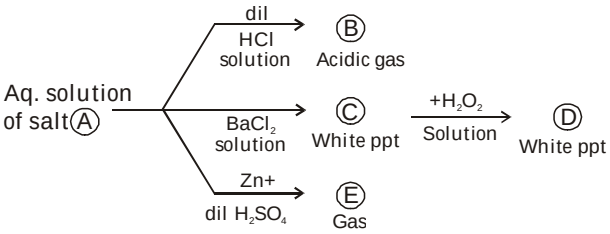
INORGANIC CHEMISTRY **TIME :30 Min**

SECTION–I(i) : (Maximum Marks : 33)

- This section contains ELEVEN questions.
- Each question has FOUR options (A), (B), (C) and (D). ONLY ONE of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories :

Full Marks : +3 If only the bubble corresponding to the correct option is darkened.
Zero Marks : 0 If none of the bubbles is darkened.
Negative Marks : –1 In all other cases

1. Which of the following reagent can distinguish between CO_2 and SO_2 gas ?
(A) Hydrogen peroxide solution (B) Chlorine water
(C) Potassium dichromate solution (D) Both (B) and (C)

2. 

The gas (E) is :-
(A) CO_2 (B) SO_2 (C) H_2S (D) NO_2

3. Salt 'X' $\xrightarrow{dil.H_2SO_4}$ No reaction

$\xrightarrow{conc.\ H_2SO_4}$ Coloured gas

$\xrightarrow[solution]{K_2Cr_2O_7/H^+}$ Reddish brown product

Salt 'X' may contain anion :-
(A) Cl^- (B) Br^- (C) NO_2^- (D) F^-

4. Which of the following ion does NOT convert yellow solution of $FeCl_3$ to green solution of $FeCl_2$ as a final product?
(A) $S_2O_3^{2-}$ (B) S^{2-} (C) Sn^{+2} (D) CH_3COO^-

5. In which of the following process yellow ppt is NOT obtained.
(A) Lead acetate solution is treated with K_2CrO_4
(B) $AgNO_3$ solution is treated with K_2CrO_4
(C) $AgNO_3$ solution is treated with KI
(D) H_2S is passed through solution of $CdSO_4$

6. Which of the following anion(s) can decolourise Br_2 water
(A) S^{-2} (B) SO_3^{-2} (C) NO_2^- (D) All

7. (X) Salt $\xrightarrow{Zn/OH^\ominus}$ $(Y)_{(g)}$ $\xrightarrow{dil.HCl}$ white fumes

$\downarrow$ red litmus

Blue

Where 'X' & 'Y' are respectively.
(A) $NaNO_2$ & NO (B) $NaNO_3$ & NH_3 (C) Na_2S & H_2S (D) $Na_2S_2O_3$ & SO_2

8. An aqueous solution of sodium salt gives pale yellow ppt and a gas with pungent odour on reaction with warm dilute hydrochloric acid then anionic part of salt is:
(A) Sulphate (B) Sulphide (C) Thiosulphate (D) Sulphite

9. Which of the following anion does not produce ppt with $BaCl_2$ solution however gives ppt with $AgNO_3$ solution.

(A) CO_3^{2-}(aq.) (B) $C_2O_4^{2-}$(aq.) (C) NO_3^-(aq.) (D) S^{2-}(aq.)

10. Consider following two observation in test tubes contain clear solution.

Test tube-1  $\xrightarrow{Ca(NO_3)_2}$ No ppt. $\xrightarrow{Pb(NO_3)_2}$ white ppt. $\xrightarrow[S_2O_3^{-2}]{\text{excess of}}$ soluble

Test tube-2  $\xrightarrow[\text{excess}]{Ca(NO_3)_2}$ No ppt. $\xrightarrow{\text{Boil}}$ white ppt. $\xrightarrow[\text{is heated}]{\text{Aq. suspension}}$ $SO_2\uparrow$

Select statement which is must be true?

(A) Test tube–1 contain CO_3^{-2} ions

(B) Test tube–2 contain CO_3^{-2} ions

(C) Test tube–1 contain $S_2O_3^{-2}$ ions

(D) Test tube–2 contain $S_2O_3^{-2}$ ions

11. $\overset{(X)}{\text{Salt}} + Na_2[Fe(CN)_5\overset{\oplus}{N}O] \xrightarrow{\text{basic solution}}$ Purple Colour

Which of the following statement is CORRECT for purple colour complex?

(A) Denticity of new ligand formed is 3

(B) It's magnetic nature is paramagnetic

(C) It is low spin complex

(D) Hybridisation of Fe is sp^3d^2

SECTION-I(ii) : (Maximum Marks: 4)

- This section contains ONE question.
- Each question has FOUR options for correct answer(s). ONE OR MORE THAN ONE of these four option(s) is (are) correct option(s).
- For each question, choose the correct option(s) to answer the question.
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 If only (all) the correct option(s) is (are) chosen.

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen.

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct options.

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option.

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered).

Negative Marks : –2 In all other cases.

12. Colour of iodine solution is disappeared by shaking it with aqueous solution of :-

(A) $S_2O_3^{2-}$ (B) $NO_2^{\ominus}$ (C) CO_3^{2-} (D) Cl_2

SECTION–I(iii) : (Maximum Marks : 12)

- This section contains TWO paragraphs.
- Based on each paragraph, there are TWO questions.
- Each question has FOUR options (A), (B), (C) and (D) ONLY ONE of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories :

Full Marks : +3 If only the bubble corresponding to the correct answer is darkened.

Zero Marks : 0 In all other cases.

Paragraph for Q. No. 13 to 14

Qualitative analysis of inorganic salts means the identification of cations and anions present in the salt or a mixture of salts. Inorganic salts may be obtained by complete or partial neutralisation of acid with base or vice-versa. In the formation of a salt, the part contributed by the *acid* is called *anion* and the part contributed by the *base* is called *cation*.

13. An acidic radical when treated with conc. sulphuric acid and heated strongly, form coloured vapour/gas. When $AgNO_3$ solution is added to aqueous solution of acidic radical no precipitate is formed. Identify the acidic radical.

(A) NO_3^- (B) NO_2^- (C) Br^- (D) I^-

14. Which of the following interfering radical does not form volatile product on addition of conc. H_2SO_4 followed by heating.

(A) PO_4^{3-} (B) F^- (C) $C_2O_4^{2-}$ (D) BO_3^{3-}

Para for Q 15 & 16

Qualitative analysis of inorganic salt is carried out through the reactions which are easily perceptible to our senses such as sight and smell. Such reactions involve:

(a) Formation of a precipitate

(b) Change in colour

(c) Evolution of gas etc.

15. Which of the following acidic radical when treated with sulphanilic acid in the presence of dil. acetic acid followed by the reaction with 1-nepthyl amine red dye is formed. When the above acidic radical treated with conc. H_2SO_4 as brown gas is evolved.

(A) NO_2^- (B) NO_3^- (C) I^- (D) SO_3^{2-}

16. Which of the following is the specific test of sulphide

(A) Methylene blue test (B) layer test

(C) Chromyl chloride test (D) Brown ring test

SECTION–I(iii) : (Maximum Marks : 3)

- This section contains ONE question.
- Each question has matching lists. The codes for the lists have choices (A), (B), (C) and (D) out of which ONLY ONE is correct
- For each question, marks will be awarded in one of the following categories :
  Full Marks : +3 If only the bubble corresponding to the correct option is darkened.
  Zero Marks : 0 If none of the bubbles is darkened.
  Negative Marks : –1 In all other cases

17. Match the following list :-

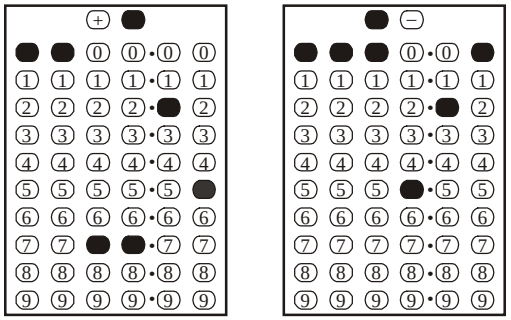
List - I (Reaction)	List - II (Characteristic odour/product)
(P) $NO_2^{\ominus} \xrightarrow{\text{conc. HCl}}$	(A) Coloured odd $e^{\ominus}$ species
(Q) $S_2O_3^{-2} \xrightarrow{\text{dil. } H_2SO_4}$	(B) Vinegar smell
(R) $HCO_3^{\ominus} \xrightarrow{\text{dil. } H_2SO_4}$	(C) Yellowish-white turbidly
(S) $CH_3COO^{\ominus} \xrightarrow{\text{dil. HCl}}$	(D) Colourless gas comes out with brisk effervescence

Code :

	(P)	(Q)	(R)	(S)
(A)	4	3	1	2
(B)	2	4	1	3
(C)	1	3	4	2
(D)	3	1	4	2

SECTION-II : (Maximum Marks: 12)

- This section contains THREE questions.
- The answer to each question is a NUMERICAL VALUE.
- For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place; e.g. 6.25, 7.00, –0.33, –.30, 30.27, –127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct) by darken the corresponding bubbles in the ORS.
  For Example : If answer is –77.25, 5.2 then fill the bubbles as follows.



- Answer to each question will be evaluated according to the following marking scheme:
  Full Marks : +4 If ONLY the correct numerical value is entered as answer.
  Zero Marks : 0 If none of the bubbles is darkened.
  Negative Marks : –1 In all other cases.

1. Among the following, total number of acidic radicals gives colourless volatile gas/vapour with dilute H_2SO_4 is.
   $C_2O_4^{2\ominus}$, $Cl^{\ominus}$, $Br^{\ominus}$, $NO_2^{\ominus}$, $NO_3^{\ominus}$, $CH_3COO^{\ominus}$, $CO_3^{2\ominus}$, $SO_3^{2\ominus}$
2. Find number of species which produces ppt/turbidity in lime water
   $CO_{2(g)}, HCO_{3(aq.)}^{-}, CO_{3(aq.)}^{2-}, HSO_{3(aq.)}^{-}, SO_{3(aq.)}^{2-}, HCl_{(g)}, SO_{2(g)}$
3. Find the number of gas(es)/vapour(s) changed the purple colour of acidified $KMnO_4$.
   CO_2, SO_2, NO_2, H_2S, HCl, CH_3COOH