GMR CLASSES
IIT- JEE | NEET | FOUNDATIONS
We proves the difference...

CHEMISTRY TEST **Date : 28-05-2021** **TOPIC : VA GROUP ELEMENTS**

Single Correct Type : 15 Q (15x4=60M) +4 , -1 scheme
One/ more than one type :10Q (10x4=40M) +4 , -1 scheme
Integer type : 5 Q (5x4=20M) +4 , 0 scheme

Single Correct Type

1. When ammonia is passed over heated CuO, it is oxidized to?
(A) HNO_2 (B) N_2O (C) N_2 (D) NO_2

2. When ammonia is passed over heated CuO, it is oxidized to?
(A) HNO_2 (B) N_2O
(C) N_2 (D) NO_2

3. Which of the following trihalide of Nitrogen is least basic?
(A) NF_3 (B) NCl_3
(C) NBr_3 (D) NI_3

4. The compound $(SiH_3)_3N$ is expected to be
(A) Pyramidal and more basic than $(CH_3)_3N$
(B) Planar and less basic than $(CH_3)_3N$
(C) Pyramidal and less basic than $(CH_3)_3N$
(D) Planar and more basic than $(CH_3)_3N$

5. Which of the following is formed when ammonia reacts with sodium hypochlorite?
(A) NH_4Cl (B) NH_2OH
(C) N_2H_4 (D) N_2

6. Which of the following oxide is least acidic?
(A) P_4O_6 (B) P_4O_{10}
(C) As_2O_6 (D) As_4O_{10}

7. Calcium metal is heated with white phosphorus in an inert atmosphere. The product A is treated with water when a gas B is liberated. B is

A) P_4O_{10} B) P_4O_6 C) PH_3 D) H_3PO_2

8. Which one of the following does not give the Brown ring test?

A) N_2O B) NO C) NO_2 D) N_2O_3

9. Tin dissolves in dilute HNO_3 forming

A) metastannic acid B) nitrous oxide

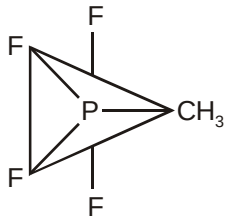
C) ammonium nitrate D) stannic nitrate

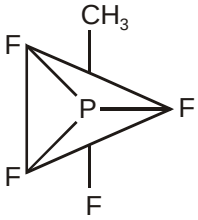
10. $A+2B+H_2O \longrightarrow C+2D$

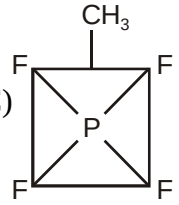
$(A=HNO_2, B=H_2SO_3, C=NH_2OH)$ Then 'D' is

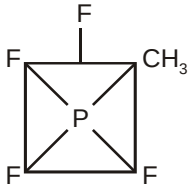
a) SO_2 b) SO_3 c) H_2SO_4 d) HNO_3

11. For the molecule PF_4CH_3 which of the following structure is the most stable considering that CH_3 is more electropositive than F

(A) 

(B) 

(C) 

(D) 

12. The hybridization/s of N in solid N_2O_5 is/are

A) sp^3, sp^2 B) sp, sp^2 C) sp, sp^3d D) sp^3

13. Which of the following statement is not correct about the hydrides of group 15 elements?

A)The hydrides of the elements of group 15 are ionic and have planar structure

B The thermal stability of the hydrides decreases down the group

C) The basic character of the hydrides decreases down the group

D) The reducing nature of the hydrides increases down the group

14. One mole of H_3PO_3 on reaction with excess of NaOH gives

(a) One moles of Na_2HPO_3 (b) Two mole of $Na_2H_2PO_3$

(c) Two moles of Na_2HPO_3 (d) One mole of Na_3PO_3

15. Most powerful reducing agent among the following is;

A) pyrophosphoric acid B) hypo phosphoric acid

C) hypo phosphorous acid D) Orth phosphorous acid

One or More than one correct type Qs

16. Out of following which are correctly indicated order?
(A) $NCl_3 < NBr_3 < NF_3 < NI_3$ (Lewis base strength)
(B) $Li_3N > Na_3N > K_3N > Rb_3N$ (Decreasing order of stability)
(C) $Cl_2 > Br_2 > F_2 > I_2$ (decreasing order of bond dissociation energy)
(D) AgF > AgCl > AgBr >AgI (decreasing order of solubility)

17. Which of the following statements are correct ?
(A) Nitrous oxide is a neutral oxide.
(B) Nitrogen trioxide is acidic
(C) Dinitrogen pentoxide is a deliquescent solid.
(D) Dinitrogen tetroxides is a mixed anhydride .

18. Cl_2 reacts in different mole ratios with NH_3 to give different products. Which of these products are formed ?

A) N_2 B) NCl_3 C) NH_4Cl D) HCl

19. Which of the following on hydrolysis produces ammonia?
(A) CaNCN (B) Borazine
(C) Li_3N (D) NCl_3

20. Which of the following contains p – p bond
a) Red phosphorous b) Hypo phosphoric acid
c) Pyro phosphoric acid d) Ortho phosphoric acid

21. Incorrect statement about PCl_5 molecule
A) It is more covalent than PCl_3
B) It has more than one bond angle
C) It has more than one bond length
D) It has one lone pair on axial position

22. Which of the following compounds does not undergo hydrolysis ?
(A) $SiCl_4$ (B) $BiCl_3$
(C) NF_3 (D) CCl_4

23. The incorrect statement among the following are
A) At high temperature N_2O_3 dissociates into two neutral oxides of
B) $H_4P_2O_6$ forms three acidic salts
C) $AgCl$ is soluble in NH_3 by forming a complex $\left[Ag(NH_3)_2\right]Cl$
D) Aqua regia is a mixture of 75% conc. HNO_3 and 25%. Conc. HCl.

24.

Pick out correct statement(s).

A) In PCl_5, P is sp^3d hybridized and has trigonal bipyramidal geometry

B) PCl_5, hydrolyses to form phosphoric acid

C) PCl_5 acts as Lewis acid

D) In PCl_5, the axial chlorine atoms are closer to central P atom than equatorial chlorine atoms

25.

Which of the following have a bond angle more than 120° ?

A) N_2O_3 B) NO_2 C) N_2O_4 D) N_2O_5

Integer Type

26. The number of S – S bond in cyclic SO_3 trimer is

27. Number of lone pairs on the central atom in XeO_3 is

28. How many peroxy bonds are in pyrophosphoric acid?

29. The number of chemical species of phosphorus among the following which contain phosphorus oxygen phosphorus bond are.

$H_4P_2O_7$, $H_4P_2O_6$, P_4O_6 , $(HPO_3)_3$,P_4O_{10}

30. The number of correct order(s) among the following:

1) $NH_3 > N_2H_4 > N_3H$ – Basic nature

2) $H_3PO_4 < H_3PO_3 < H_3PO_2$ – Acidic nature

3) $NH_3 < PH_3 < AsH_3 < SbH_3$ – Reducing nature

4) $NH_3 > PH_3 > AsH_3 > SbH_3$ – Boiling point

5) $NH_3 > PH_3 > AsH_3 > SbH_3$: Bond angle

6) $NH_3 > PH_3 > AsH_3 > SbH_3$: Enthalpy of dissociation

7) $N_2O_5 < P_2O_5 < As_2O_5 < Sb_2O_5$: Acidic nature

GMR CLASSES
IIT- JEE | NEET | FOUNDATIONS
We proves the difference...

CHEMISTRY TEST **TOPIC : V GROUP ELEMENTS**
Date : 28-05-2021

Single Correct Type : 15 Q (15x4=60M) +4 , -1 scheme
One/ more than one type :10Q (10x4=40M) +4 , -1 scheme
Integer type : 5 Q (5x4=20M) +4 , 0 scheme

KEY SHEET

1-C	2-C	3-A	4-B	5-C	6-C	7-C	8-A	9-C	10-C
11-A	12-B	13-A	14-A	15-C	16-ABCD	17-ABCD	18-ABCD	19-ABCD	20-AB
21-D	22-CD	23-AD	24-ABC	25-ABCD	26-0	27-1	28-0	29-4	30-5

HINTS & SOLUTIONS

1. Conceptual
2. $3CuO + 2NH_3 \longrightarrow 3Cu + N_2 + 3H_2O$
3. NF_3 is least basic due to highest electronegativity of Fluorine
4. $(SiH_3)_3N$ is planar and less basic than $(CH_3)_3N$ because lone pair of N atom is used in $p\pi - d\pi$ back bonding with Si atom.
5. $2NH_3 + NaOCl \longrightarrow N_2H_4 + NaCl + H_2O$
6. Oxide of Arsenic is less acidic than oxide of phosphorus. Lower is the O.S, Lower is the acidic in nature
7. $Ca + P \xrightarrow[\Delta]{} Ca_3P_2 \xrightarrow[H_2O]{} PH_3$
8. N_2O, N is in + 1 oxidation state (Lower than NO)
9. $4Sn + 10HNO_3 \rightarrow 4Sn(NO_3)_2 + NH_4NO_3 + 3H_2O$

10. $HNO_2 + 2H_2SO_3 + H_2O \rightarrow NH_2OH + 2H_2SO_4$

11. Greater electronegativity when bonding through axial position.

12. B

$NO_2^+ NO_3^-$

13. A

14. Conceptual

15. Hydrogen atom bonded to phosphorus are readily available as nascent hydrogen to carryout reduction. Thus, the more the number of such bonds the stronger is the reducing action of the compound.

<u>Copmpound Formula Number of P-H bonds present</u>

Pyrophosphoric acid $H_4P_2O_7 - O$

Hypophosphoric acid $H_4P_2O_6 - O$

Hypophosphorous acid $H_3PO_2 - 2$

Ortho Phosphorous acid $H_3PO_3 - 1$

16. ABCD

17. Conceptual

18. $NH_3 + 3Cl_2\,(excess) \rightarrow NCl_3 + 3HCl$

$8NH_3\,(excess) + 3Cl_2 \rightarrow N_2 + 6NH_4Cl$

19. a) $CaNCN \xrightarrow{H_2O} NH_3 + Ca(OH)_2$

b) $B_3N_3H_6 \xrightarrow{H_2O} H_3BO_3 + NH_3$

c) $Li_3N \xrightarrow{H_2O} Li(OH)_2 + NH_3$

d) $NCl_3 \xrightarrow{H_2O} NH_3 + HOCl$

20. A, B

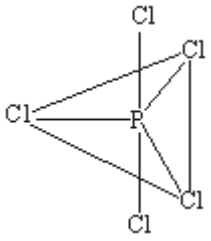
21. D

22. $SiCl_4 + 4H_2O \longrightarrow H_4SiO_4 + 4HCl$

$BiCl_3 + H_2O \longrightarrow BiOCl + 2HCl$

23. Fact

24. (a) and (b) and (c) Explanation : (a), (b), (c) are correct

(a) 

sp^3d hybridized, trigonal bipyramidal.

(b) $PCl_5 + 4H_2O \rightarrow H_3PO_4 + 5HCl$

(c) $PCl_5 \quad + \quad Cl^- \quad \rightarrow \quad [PCl_6]$

[Lewis acid] [Lewis base]

PCl_5 acts as Lewis because it can accept Cl^- (a Lewis base) due to presence of vacant d-orbitals.

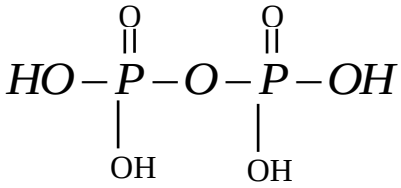
(d) is not correct because axial bonds are away from phosphorus atom than equatorial bonds as shown in structure given above.

25. All have bond angle around 130o

26.Fact

27. Fact

28.



29. Conceptual

30. 5

(1, 2, 3, 5, 6)
