

Class: 12
Subject: chemistry
Topic: P Block
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. Among these ores the highest phosphorus content is in

- A. chlorapatite
- B. phosphorite
- C. fluorspar
- D. equal

Sol: B

2. $p\pi-p\pi$ multiple bonding is present in

- A. oxides of nitrogen
- B. oxides of phosphorus
- C. halides of nitrogen
- D. halides of phosphorus

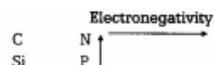
Sol: A

There are only valence p-orbitals in N and O. Thus there is $p\pi-p\pi$ bonding in oxides of nitrogen.

3. The electronegativities of N, C, Si and P are such that

- A. $P < Si < C < N$
- B. $Si < P < N < C$
- C. $Si < P < C < N$
- D. $P < Si < N < C$

Sol: C



Electronegativity increases along a period left to right. Thus,

$C < N$

$Si < P$

Electronegativity decreases down the group.

Then $C > Si$

$N > P$

Thus, $Si < P < C < N$

4. What is the role of phosphate ion in a detergent?

- A. It reduces pH of the water
- B. It increase pH of the water
- C. It removes Ca^{2+} and Mg^{2+} ions from water that causes hardness
- D. It increases its solubility in water

Sol: D

5. Nitrosonium ion (NO^+) is isoelectronic with

- A. carbon dioxide
- B. carbon monoxide
- C. nitrogen dioxide
- D. nitric oxide

Ans. B

Solution:

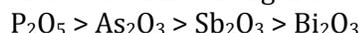
(a) CO_2	22
(b) CO	14
(c) NO_2	23
(d) NO	15

6. Of the following compounds the most acidic is

- A. As_2O_3
- B. P_2O_5
- C. Sb_2O_3
- D. Bi_2O_3

Ans. B

Solution: Acidic strength of oxides decreases along a group from upward to downward. Thus, the order of acidic strength is



7. The bond angle in AsH_3 is greater than that in

- A. NH_3
- B. H_2O
- C. BCl_3
- D. None of these

Answer: D

8. Which is least basic?

- A. NF_3
- B. NCl_3
- C. NBr_3
- D. NI_3

Ans. A

Solution:

Fluorine is the most electronegative element thus tendency of N-atom to donate lone pair (to behave as Lewis acid) is least.

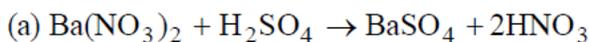
9. A colourless salt gives a white ppt (soluble in ammonium acetate) and a brown coloured pungent gas on reaction with conC .

H_2SO_4 . Salt is

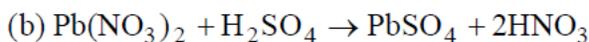
- A. $\text{Ba}(\text{NO}_3)_2$
- B. $\text{Pb}(\text{NO}_3)_2$
- C. NaNO_3
- D. NH_4NO_3

Ans. B

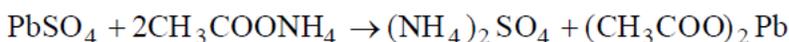
solution:



Insoluble in $\text{CH}_3\text{COONH}_4$



Soluble in $\text{CH}_3\text{COONH}_4$



10. Assertion (A) Each N-atom is sp^3 -hybridised in N_2H_4 .

Reason (R) It has gauche conformation.

- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
- B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

Solution: B

11. Which of the following statements are true?

- A. Cold and very dilute HNO_3 forms NH_4NO_3 with Zn or Sn
- B. Concentrated HNO_3 forms H_2SnO_3 with Sn
- C. Cold and more concentrated HNO_3 forms NO_2 with Cu
- D. All the above are correct

Solution: D

12. Which one of the following acid possesses oxidising, reducing and complex forming properties?

- A. HNO_3
- B. HCl
- C. H_2SO_4
- D. HNO_2

Solution: D

13. Which is/are true statements?

- A. Sulphur trioxide exists as cyclic trimer in solid state, S_3O_9
- B. Selenium trioxide solid is a cyclic tetramer, Se_4O_{12}
- C. TeO_3 is a solid with a network structure in which TeO_6 octahedra share all vertices
- D. All of the above are correct

Solution: D

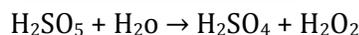
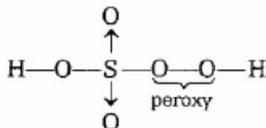
14. Which of the following has peroxy linkage?

- A. $H_2S_2O_3$
- B. H_2SO_5
- C. $H_2S_2O_7$
- D. $H_2S_4O_6$

Ans. B

Solution:

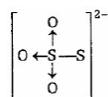
H_2SO_5 called peroxy sulphuric acid (Caro's acid) has peroxy linkage



15. S-S bond is present in

- A. $\alpha - (SO_3)_n$
- B. $\gamma - (S_3O_9)$
- C. $H_2S_2O_3$
- D. $H_2S_2O_8$

Solution: C



16. Which of the following species have undistorted octahedral structures?

- 1. SF_6
- 2. PF_6^-
- 3. SiF_6^{2-}
- 4. SeF_6

Select the correct answer using the codes given below

- A. 2, 3 and 4
- B. 1, 2 and 3
- C. 1, 3 and 4
- D. 1, 2 and 4

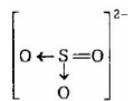
Solution: D

17. In SO_3^{2-}

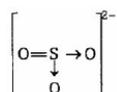
- A. $d\pi-p\pi$ bond between S and O is delocalized
- B. Bonds between S and O are equivalents
- C. There is sp^3 hybridised sulphur atom
- D. All of the facts given above are true

Ans. D

Solution:



$d\pi - p\pi$ bond due to d-orbital in sulphur and this is delocalised by resonance. Thus, (a) is true.



- (b) Due to resonance (S-O) bonds are equivalent. Thus, (b) is true.
(c) S-atom is sp_3 -hybridised. Thus, (c) is also true.

18. The order of stability of metal oxide is

- A. $\text{Cr}_2\text{O}_3 < \text{MgO} < \text{Al}_2\text{O}_3 < \text{Fe}_2\text{O}_3$
B. $\text{Fe}_2\text{O}_3 < \text{Cr}_2\text{O}_3 < \text{Al}_2\text{O}_3 < \text{MgO}$
C. $\text{Fe}_2\text{O}_3 < \text{Al}_2\text{O}_3 < \text{Cr}_2\text{O}_3 < \text{MgO}$
D. $\text{Al}_2\text{O}_3 < \text{MgO} < \text{Fe}_2\text{O}_3 < \text{Cr}_2\text{O}_3$

Ans. B

Solution:

As stability is directly related to lattice energy and lattice energy depends on charge and size of ions. So, the order is $\text{Fe}_2\text{O}_3 < \text{Cr}_2\text{O}_3 < \text{Al}_2\text{O}_3 < \text{MgO}$.

19. Hypochlorite disproportionates to give

- A. Cl^- and ClO_4^-
B. ClO_4^- and ClO_3^-
C. ClO_3^- and Cl^-
D. ClO_2^- and Cl^-

Ans. C

Solution:

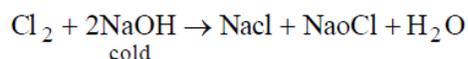


20. When Cl_2 is passed through cold dil. NaOH, the products are

- A. NaCl, NaOCl and H_2O
B. NaCl, NaClO_2 and H_2O
C. NaCl, NaClO_3 and H_2O
D. NaCl, NaClO_4 and H_2O

Ans. A

Solution:



Cl_2 disproportionates to NaCl and NaOCl.

21. Assertion (A) Cl_2 or Br_2 changes KI into I_2 (violet in CCl_4 layer), Cl_2 changes KBr into Br_2 (orange-yellow in CCl_4 layer).

Thus, Cl_2 would change mixture of KI and KBr into violet layer in CCl_4 .

Reason (R) Oxidising power is in order $\text{I}_2 < \text{Br}_2 < \text{Cl}_2 < \text{F}_2$.

- A. Both (A) and (B) are true and (R) is the correct explanation of (A).
B. Both (A) and (B) are true but (R) is not the correct explanation of (A).
C. (A) is true but (B) is false.
D. (A) is false but (R) is true.

Ans. A

Solution:

Cl oxidises Br to Br and Br oxidises I to I₂ (violet)

22. Which one of the following halogens has the highest bond dissociation energy?

- A. F₂
- B. Cl₂
- C. Br₂
- D. I₂

Ans. B

Solution:

As the size increases bond length increases, thus bond dissociation energy decreases.

Molecule	Bond dissociation energy
F ₂	158.8
Cl ₂	242.6
Br ₂	192.8
I ₂	151.1

However, the dissociation energy of fluorine is lesser than Cl₂ because of its small size. Hence, Cl₂ has the highest bond dissociation energy.

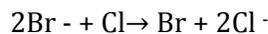
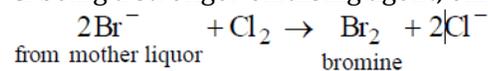
23. In the manufacture of bromine from sea water, the mother liquor containing bromide is treated with

- A. carbon dioxide
- B. chlorine
- C. iodine
- D. sulphur dioxide

Ans. B

Solution:

Cl being a stronger oxidising agent, oxidises bromide present in the mother liquor or Br⁻.



bromine

2 2

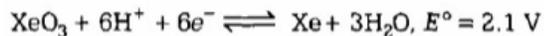
from mother liquor

24. Select correct statement(s).

- A. Cl₂O and ClO₂ are used as bleaching agents and as germicides.
- B. I₂O₅ is used in the quantitative estimation of CO.
- C. Bond angle XOY varies in the order FOF < ClOCl < BrOBr.
- D. All of the above are correct statements.

Solution: D

25. Assertion (A) The reaction,



is not feasible thermodynamically to oxidise H_2O

Reason (R) There is a high activation energy barrier between oxidation state +6 and 0 of Xe.

- A. Both (A) and (R) are true and (R) is the correct explanation of (A).
 B. Both (A) and (R) are true but (R) is not the correct explanation of (A).
 C. (A) is true but (R) is false.
 D. (A) is false but (R) is true.

Solution: C

26. Neon lamps are used in botanical gardens and in green houses as they

- A. provides oxygen
 B. provide better light
 C. stimulate growth of plants
 D. None of the above

Solution: C

27. Match List I with List II and select the correct answer using the codes given below the list

	List I	List II
A.	XeF_4	1. Distorted octahedral
B.	XeF_6	2. Tetrahedral
C.	XeO_3	3. Square planar
D.	XeO_4	4. Pyramidal

Codes									
	A	B	C	D	A	B	C	D	
(a)	1	2	3	4	(b)	3	1	4	2
(c)	1	3	2	4	(d)	2	4	1	3

- A. A
 B. B
 C. C
 D. D

Solution: B

28. The coloured discharged tubes for a advertisement mainly contain

- A. xenon
 B. helium
 C. neon
 D. argon

Ans; c

solution:

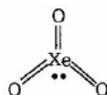
Neon gives brilliant orange red glow in discharge tubes and is widely used for advertisement purposes.

29. Lone pair and π -bonds exist in

- A. XeF_2
- B. XeO_3
- C. XeF_6
- D. XeO_4

Ans. B

solution::



Three π -bonds and one lone pair

30. Which of the following is not known?

- A. XeF_6
- B. XeF_4
- C. KrF_6
- D. Cs_2XeF_6

Solution:

KrF_6 is not known.

Solution: C