NARAYANA EDUCATIONAL INSTITUTIONS

# GROUP-18

DPP-Q.PAPER

## *CHEMISTRY*

1. Which product will not form on complete hydrolysis of $XeF_4$?

   1) $Xe$ 2) $O_2$ 3) $XeO_2F_2$ 4) $XeO_3$

2. $XeF_2$ On hydrolysis with water does not give

   1) $Xe$ 2) $XeO_3$ 3) $XeO_2F_2$ 4) both 2 &3

3. Which of the following species is obtained in the following traction?
   $XeF_4 + SbF_5 \rightarrow$

   1) $[XeF_6]^{2-}$ 2) $[XeF_2]^{2+}$ 3) $[XeF_5]^{-}$ 4) $[XeF_3]^{+}$

4. $XeF_2$ Reacts with $PF_5$ to form

   1) $[XeF_2]^{+}[PF_6]^{-}$ 2) $[XeF]^{+}[PF_6]^{-}$ 3) $Xe^{2+}[PF_7]^{2-}$ 4) $[PF_4]^{+}[XeF_3]^{-}$

5. Hydrolysis reaction of which of the following compounds involves disproportionation of any element

   1) $ClF$ 2) $XeF_6$ 3) $XeF_4$ 4) $Icl_5$

6. On complete hydrolysis of $XeF_6$, a compound of xenon 'A' is produced , A is _____

   1) $XeO_3$ 2) $XeO_2F_2$ 3) $XeOF_4$ 4) $XeO_4$

7. The molecule in which there is no lone pair on xenon atom is

   1) $XeF_6$ 2) $XeF_2$ 3) $XeO_4$ 4) $XeF_4$

8. The correct order of boiling point for the given elements is

   1) $He > Ne > Xe > Ar > Kr$ 2) $Xe > Kr > Ar > Ne > He$
   3) $He > Ne > Ar > Kr > Xe$ 4) $Xe > Ar > Kr > Ne > He$

9. Which is mismatched regarding the shape ?

   1) $XeF_4$ = Square planar 2) $XeOF_4$ = Square pyramidal
   3) $XeF_6$ = Distorted octahedral 4) $XeO_3$ = Bent T-shape

10. $Xe + F_2 \xrightarrow[\text{excess}]{} A$ $Xe + F_2 \xrightarrow[(1:5)]{} B$ $Xe + F_2 \xrightarrow[(1:20)]{} C$ The correct statement about product A,B,C is

    1) $Xe$ is $SP^3d$ hybridized in A 2) 2 lone pairs are present on $Xe$ in B
    3) $SP^3d^3$ hybridization of $Xe$ in C 4) All of these

11. The first ionization enthalpy of molecular oxygen is almost identical with

    1) Helium 2) Xenon 3) Neon 4) Argon

12. Among the following molecules

a) $XeO_3$ b) $XeOF_4$ c) $XeO_2F_2$

Those have same number of lone pairs on " Xe" are

1) a&c only 2) b&c only 3) a,b,&c 4) a&b only

13. Components of gaseous mixture useful for sea divers

1) $O_2$ and He 2) $O_2$ and $H_2$ 3) $O_2$ and $N_2$ 4) $O_2$ and $CO_2$

14. Hydrolysis of which compound of Xe is not a redox reaction?

1) $XeF_2$ 2) $XeF_6$ 3) $XeF_4$ 4) Both 1 & 3

15. Which one of the following does not form during the hydrolysis of $XeF_6$

1) $XeO_3$ 2) $XeOF_4$ 3) $XeO_2F_2$ 4) $XeOF_3$

16. Select the correct matching

| List –I | List-II |
|---|---|
| A. $XeF_4$ | 1. Pyramidal |
| B. $XeF_6$ | 2. T- Shape |
| C. $XeO_3$ | 3. Distorted octahedral |
| D. $XeOF_2$ | 4 Square planar |

| | A | B | C | D |
|---|---|---|---|---|
| 1) | 4 | 3 | 1 | 2 |
| 2) | 1 | 2 | 3 | 4 |
| 3) | 2 | 1 | 3 | 4 |
| 4) | 4 | 1 | 3 | 2 |

17. Which of the following is not correct

1) $XeOF_2$ has four $\sigma$ and four $\pi$ bonds

2) The hybridization of Xe in $XeF_4$ is $SP^3d^2$

3) Among noble gases, the occurrence of argon is highest in air

4) Liquid helium is used as crygenic liquid

18. Number of bond pairs and lone pairs respectively that the central atom in xenon difluoride has

1) 2,6 2) 2,3 3) 2,4 4) 2,2

19. The formation of $O_2^+\left[PtF_6\right]^-$ in the basis for the formation of Xenon fluorides. This is because

1) $O_2$ and $Xe$ have comparable sizes 2)Both $O_2$ and $Xe$ are gases

3) $O_2$ and $Xe$ have comparable ionisation energies 4) Both 1 &3

20. Which statement about Noble gas is not correct?

1) $Xe$ forms $XeF_6$

2) $Ar$ in used in electric bulbs

3) $Kr$ is obtained during radioactive disintegration

4) He has the lowest b.pt among all noble gases

21. Which one of the following is correct pair with respect to molecular formula of Xenon compound and hybridization state of Xenon in it

1) $XeF_4, SP^3$ 2) $XeF_2, SP$ 3) $XeF_2, SP^3d$ 4) $XeF_4, SP^2$

22. ${}^{222}_{86}Rn$ *and* ${}^{4}_{2}He$ both the noble gases can be obtained by the nuclear disintegration of

1) $Po$ 2) $Ra$ 3) $Th$ 4) $U$

23. Which of the following statements is incorrect?
1) He-II has zero viscosity 2) Beacon signal light uses Ne
3) $Xe[PtF_6]$ Was first prepared by Bohr 4) $XeO_3$ has pyramidal shape

24. In $XeF_6$ molecule, Xenon atom undergoes
1) $SP^3d^2$ Hybridization in its 2nd excited state
2) $SP^3d^3$ Hybridization in its 2nd excited state
3) $SP^3d^3$ Hybridization in its 3rd excited state
4) $SP^3d^3$ Hybridization in its 4th excited state

25. Regarding $XeF_2$, the correct combination is
1) $SP^3d-4L.P$ 2) $SP^3d-3L.P$ 3) $SP^3d-2L.P$ 4) $SP^3d-1L.P$

26. The vacation $Xe(\text{excess}) + F_2 \rightarrow XeF_2$ conducted at
1) 573K, 16-70 bar 2) 273K, 10 bar 3) 673K, 1 bar 4) 873K, 7 bar

27. Number of I and II bonds present in $XeOF_4$ molecule are
1) 5 $\sigma$ and 1 $\pi$ 2) 4 $\sigma$ and 2 $\pi$ 3) 2 $\sigma$ and 4 $\pi$ 4) 3 $\sigma$ and 3 $\pi$

28. The noble gas compound iso-structural with bromate ion is :
1) $XeO_3$ 2) $XeF_4$ 3) $XeF_2$ 4) $XeOF_2$

29. $XeF_6 + MF \rightarrow M^+[XeF_7]^-$, Here "M" is
1) Alkali metal 2) Alkaline earth metal
3) Transition metal 4) Inner transition metal

30. The incorrect statement regarding to Noble gases is
1) Their electronegative values are zero
2) They are held together by vanderwaal forces
3) They occupy the peaks in the graphs of ionization potential and atomic number
4) Their boiling points decrease from He to Xe

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## CHEMISTRY

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-10 | **3** | **4** | **4** | **2** | **3** | **1** | **3** | **4** | **4** | **4** |
| 11-20 | **2** | **3** | **1** | **2** | **4** | **1** | **1** | 2 | 4 | 3 |
| 21-30 | 3 | 2 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 4 |

## SOLUTIONS

1. $XeO_2F_2$ is not formed

$6XeF_4 + 12H_2O \rightarrow 4Xe + 24HF + 30_2 + 2XeO_3$

2. $XeF_2$ on hydrolysis given $Xe, HF \,\&\, O_2$

$2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$

3. $XeF_4 + SbF_5 \rightarrow [XeF_3]^+[SbF_6]^-$

$XeF_4$ reacts with $SbF_5$ which is a lewis acid to form adduct. Cation is T –shape and anion is octahedral

4. $XeF_2 + PF_5 \rightarrow [XeF]^+ [PF_6]^-$

$PF_5$ is a fluoride ion acceptor

5. $6XeF_4 + 12H_2O \rightarrow 4Xe + 24HF + 3D_2 + 2XeO_3$

Out of $6XeF_4$, $4XeF_4$ undergo reduction and $2XeF_4$ undergo oxidation

$4XeF_4 \rightarrow 4Xe \quad 2xeF_4 \rightarrow 2XeO_3$

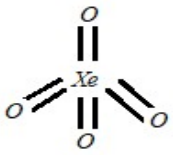
$-16 \qquad 0 \qquad (+4) \qquad (+12)$

$(\text{Re}\,duction) \qquad\qquad (oxidation)$

6. Complete hydrolysis of $XeF_6$, gives a Xenon compound $XeO_3$ $\therefore A = XeO_3$

$XeF_6 + 3H_2O \rightarrow \underset{(A)}{XeO_3} + 6HF$

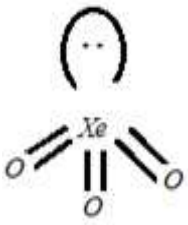
7. $XeF_4$ has no lone pairs on Xenon atom




8. Boiling point of Noble gases in kelvin

| $He$ | $Ne$ | $Ar$ | $Kr$ | $Xe$ |
|---|---|---|---|---|
| 4.0 | 27.0 | 87.0 | 121.0 | 165.0 |

9. $XeO_3$ has pyramidal shape with one lone pair on central atom, Xenon




10. $Xe + F_2 \rightarrow XeF_2$

$(excess) \qquad (A)$

In $XeF_2, Xe\ is\ SP^3d$ hybridized

$Xe + 2F_2 \rightarrow XeF_4$

$(1:5) \qquad (B)$

In $XeF_4$, there are 2 lone pairs on Xenon

$Xe + 3F_2 \rightarrow XeF_6$

$(1:20) \qquad (C)$

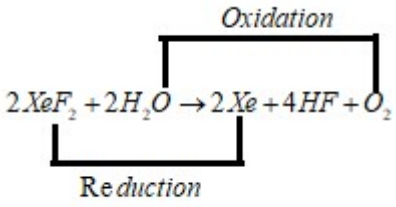
In $XeF_6, Xe$ undergoes $SP^3d^3$ hybridization

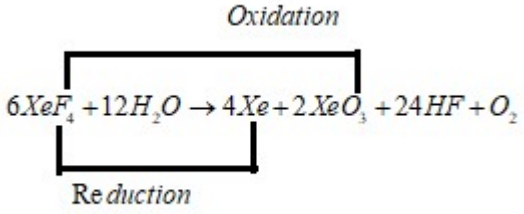
11. The first I.E of oxygen ( 1165 kj/mol) is
Comparable to that of Xe ( 1140 kj/mol)

12. $XeO_3, XeOF_4$ *and* $XeO_2F_2$ have one lone pair of electron on the central atom

13. A mixture of 80% Helium and 20% oxygen by volume is used by deep sea divers for respiration

14. Hydrolysis of $XeF_2$ *and* $XeF_4$ are redox reaction




$\overset{+6-1}{XeF_6} + 3\overset{-2}{H_2O} \rightarrow \overset{+6-2}{XeO_3} + 6\overset{-1}{HF}$

Oxidation state is not changed Hence it is not redox reaction

$\therefore$ Correct option is 2

15. Hydrolysis of $XeF_6$ given on complete hydrolysis $XeF_6 + 3H_2O \rightarrow XeO_3 + 6HF$
on partial hydrolysis ,

$XeF_6 + 2H_2O \rightarrow XeO_2F_2 + 4HF$

$XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$

$XeOF_3$ is not formed during hydrolysis of $XeF_6$ because *Xe is* not pentavalent

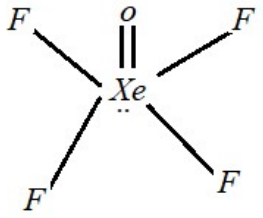
16. A $XeF_4 \rightarrow$ has 2 lone pairs and 4 bond pairs $SP^3d^2$ with square planar shape

B $XeF_6 \rightarrow$ has 1 lone pair, 6 bond pairs $SP^3d^3$ with distorted octahedral shape

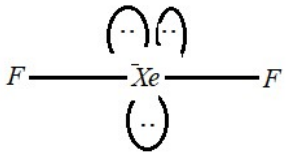
C $XeO_3 \rightarrow$ has 1 lone pair, 3 bond pairs, $SP^3$ with papramidal shape

D $XeOF_2 \rightarrow$ has 2 lone pairs, 3 bond pairs, $SP^3d$ with T-shape

17. $XeOF_4$ has 5 $\sigma$ bonts , 1 $\pi$ bond



18. In $XeF_2$, central atom $Xe$ have 2 bond pairs and 3 lone pairs



19. IE of $O_2$ (1165kj/mol) is comparable to that of Xenon gas ( 1140kj/mole) and their molecular diameters are also similar $\left(Xe = 4A^0, O_2 = 4A^0\right)$

20. Rn ,He are obtained by radioactive disintegration of Ra
Kr is not obtained during radioactive disintegration

21. $XeF_4 \rightarrow SP^3d^2$

$XeF_2 \rightarrow SP^3d$

22. $^{226}_{88}Ra \rightarrow {}^{222}_{86}Rn + {}^{4}_{2}He$

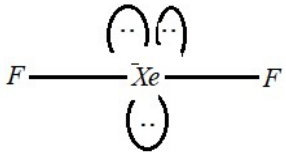
23. The first chemical compound of noble gas was reported by Bartlett is $Xe^+\left[PtF_6\right]^-$
(orange yellow crystalline compound )

24. $Xe \rightarrow G.S$ $\underset{5s}{\boxed{\downarrow\uparrow}}$ $\underset{5p}{\boxed{\downarrow\uparrow}\boxed{\downarrow\uparrow}\boxed{\downarrow\uparrow}}$

3rd E.S $\underset{5s}{\boxed{\downarrow\uparrow}}$ $\underset{5p}{\boxed{\uparrow}\boxed{\uparrow}\boxed{\uparrow}}$ $\underset{5d}{\boxed{\uparrow}\boxed{\uparrow}\boxed{\uparrow}\boxed{}\boxed{}}$

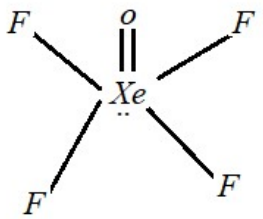
In the third E.S, One S, three $p$ and three d-orbitals intermix to undergo $SP^3d^3$ hybridization

25. $XeF_2$ has 3 lone pairs on central atom Xenon



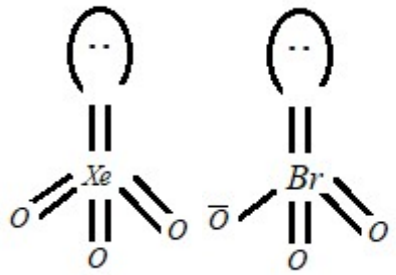
26. $\underset{exess}{Xe} + F_2 \xrightarrow{673k,1bar} XeF_2$

27. $XeOF_4$ *has* $5\sigma$ *and* $1\pi$ *bond*



28. Bromate ion $\left(BrO_3^-\right)$ is iso structural with $XeO_3$

Both $XeO_3$ *and* $BrO_3^-$ *ion* have trigonal pyramidal structure where central atom $\left(Xe \& Br\right)$ are surrounded by 3 oxygen atoms




29. $XeF_6 + MF \rightarrow M^+\left[XeF_7\right]^-$

$M = Na, k, Rb\left(or\right)\ Cs$

(*alkali metals*)

30. B.P of noble gases increases from He to $Xe$

$He < Ne < Ar < Kr < Xe$

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