

CHEMISTRY**Max. Marks: 80****SECTION – I**
(SINGLE CORRECT CHOICE TYPE)

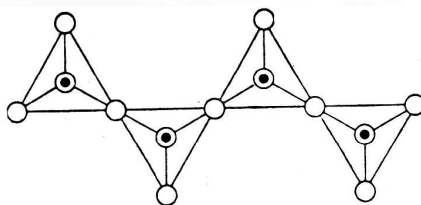
This section contains **7 multiple choice questions**. Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct

1. $P_4 + Ba(OH)_{2(solution)} \xrightarrow{\Delta} PH_3 (\uparrow) + 'A' \xrightarrow{H_2SO_4} BaSO_4 + 'B'$. The correct statement about B is
- A) It is a tribasic acid
B) Oxidation state of central atom is +3
C) It has three P-H bonds
D) It forms a normal salt
2. Under hydrolytic condition, the compound used for preparation of linear silicones is $(CH_3)_2SiCl_2$, which is industrially prepared by
- A) $SiCl_4 + CH_3MgX \xrightarrow{dry\ ether} \quad$ B) $SiCl_4 + LiCH_3 \xrightarrow{dry\ ether} \quad$
C) $2CH_3 - Cl + Si \xrightarrow[280-300^\circ C]{'Cu'}$ D) All the above
3. PCl_5 on reaction with SO_2 forms compound X and Y. X and Y are
- A) $SOCl_2, POCl_3$ B) $SO_2Cl_2, POCl_3$ C) $SOCl_4, POCl_3$ D) SCl_4, P_4O_6

4. i) $K_2Cr_2O_7 + 'A'_{(gas)} \xrightarrow{H^+} \text{green solution}$
ii) $K_2Cr_2O_7 + 'B'_{(gas)} \xrightarrow{H^+} \text{green solution} + C(\text{ppt})$

From above observation identify the gases **A & B** are respectively

- A) SO_2, CO B) SO_2, H_2S C) SO_2, SO_3 D) H_2S, SO_2
5. The reaction involved in preparation of oxygen by Brin's process is
- A) $HgO \xrightarrow{\Delta} Hg + O_2$ B) $KO_2 \xrightarrow{\Delta} K_2O + O_2$
C) $BaO_2 \xrightarrow{\Delta} BaO + O_2$ D) $Na_2O_2 \xrightarrow{\Delta} Na_2O + O_2$
6. A mineral contains tetrameric anion, in which $\bullet = Si$, O = oxygen



Select correct option about **the** anion

- A) The formula of anion is $(SiO_3)_n$ (where $n=4$)
B) It has **nine** negative charges
C) It has three shared oxygen and ten unshared oxygen atoms
D) it is planar

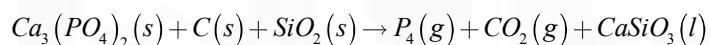
7. $S + F_2$ (diluted with N_2) $\rightarrow X + Y$. X and Y are

- A) SF_2, SF_4 B) SF_4, SF_6 C) S_2F_2, SF_2 D) S_2F_2, SF_4

SECTION – II
(MORE THAN ONE TYPE)

This section contains 4 **multiple choice questions**. Each question has four choices a), b), c), d) out of which **ONE OR MORE** may be correct.

8. Elemental phosphorus is produced industrially by heating phosphate rock, coke, sand (silica) at about 1500°C in an electrical furnace, the reaction is represented as



Identify the correct options

- A) Phosphorus produced in above reaction is red phosphorus
B) On heating red phosphorus changed to white phosphorus
C) Phosphorus produced in the above reaction is white phosphorus
D) Heating white phosphorus changes it to red phosphorous

9. $TeF_6 + H_2O \rightarrow H_6TeO_6 + 6HF$

The correct statements about H_6TeO_6 are

- A) It is hexa basic acid B) it is dibasic acid
C) it is weak acid D) It is strong acid

10. Choose the correct statements
- A) graphite is electrically conductive
 - B) Diamond is thermally conductive
 - C) **Diamond, graphite and C_{60} are all crystalline allotropes of carbon**
 - D) Intercalation compounds of graphite with alkali metal is more conductive than graphite
11. Which of the following are used for identification of O_3 ?
- A) It causes tailing of mercury.
 - B) It turns silver foil to black colour.
 - C) It turns starch iodine paper to black.
 - D) It turns benzidine paper to brown.

SECTION – III
(PARAGRAPH TYPE)

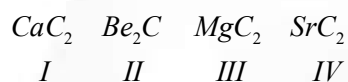
This section contains 2 **paragraphs**. Each of these questions has four choices a), b), c) and d) out of which **ONLY ONE** is correct

Paragraph for Questions Nos. 12 to 14

The term carbides is generally applied to compounds in which carbon is bonded to element of lower electro negativity. Reactive metals (i.e group 1 or 2 forms ionic

carbides, they hydrolyze to liberate hydrocarbons. Most of them resemble NaCl crystal structure. Transition elements form Interstitial carbides.

12. Consider following carbides



Select the carbide which gives different product on hydrolysis than other carbides

- A) I B) II C) IV D) III

13. What is the coordination number of Ca^{+2} in solid CaC_2

- A) 6 B) 4 C) 8 D) 12

14. The conductance of transition metal is not much affected when it forms **an** **interstitial** carbide because:

- A) The carbide anion helps in conduction
B) Carbon atom occupies octahedral holes and so does not **alter** electrical conductivity
C) The carbon atom reacts with metal and liberates electrons
D) The conduction is due to holes

Paragraph for Questions Nos. 15 to 16

Ozone is an unstable dark blue gas. It absorbs the U.V radiation, **thus** protecting the people on the earth from the harmful U.V radiation. The use of (CFC) chlorofluoro carbons in aerosols and refrigerators, and their subsequent escape in to the atmosphere, is blamed for making holes in the ozone layer. Ozone can act as strong oxidizing agent in acidic and alkaline medium.

15. Entire O_3 is consumed in oxidation of

A) SO_2

B) $SnCl_2/HCl$

C) NO_2^-

D) a & b

16. Choose correct statement regarding oxidation of given molecules/ions by O_3 in acidic medium

i) S^{2-}

ii) H_2S

iii) SO_3^{2-}

iv) moist S

A) (I) to (IV) are oxidised to SO_4^{2-}

B) Only (II) is **oxidised** to SO_4^{2-}

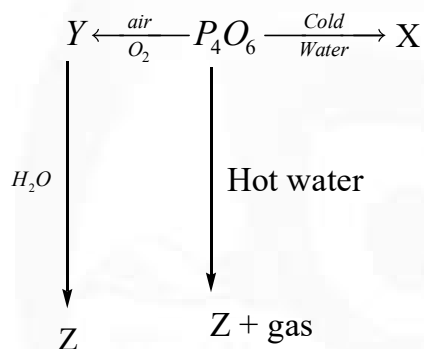
C) (I) (III) (IV) are oxidised to SO_4^{2-}

D) (II) is **oxidised** to SO_2

SECTION – IV
INTEGER TYPE

(This section contains **7 questions**. The answer to each question is a single digit integer ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled)

17.



The unprotonated oxygen in X and **Z** together is _____

18. Among Fe, Co, Ni, Al, Be, Cr, Au the number of metals which becomes passive by highly concentrated nitric acid is
19. How many of the following are correct ?
- (I) $\gamma\text{-SO}_3 > \alpha$ or β SO_3 (number of S-O-S bonds)
 - (II) $\text{SF}_6 > \text{SeF}_6$ (Stability)
 - (III) $\text{SF}_6 > \text{TeF}_6$ (**rate of** reaction with water)
 - (IV) acidic medium > basic medium (Reducing power of SO_2)
 - (V) $\text{O}_3^- < \text{O}_2$ (**magnetic moment** character)
 - (VI) $\text{SO}_{2(\text{dry})} > \text{SO}_{2(\text{moist})}$ (bleaching action)

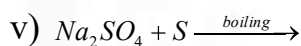
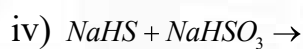
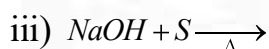
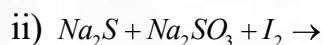
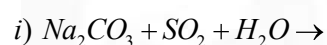
20. Given $H_3PO_2, H_3PO_3, H_3PO_4, H_4P_2O_7, H_4P_2O_5$

The number of dibasic acids containing P-H bond is

21. $P_4O_6, P_4O_{10}, P_4O_7, P_4O_8, P_4O_9$

Some of the above oxides on reaction with water form mixture of phosphorous and phosphoric acid. The total number of moles of phosphoric acid formed from such oxides when one mole each of the oxides is treated with water is

22. Given



In how many of above reactions hypo is one of the product ?

23. $H_2O + Cu(NO_3)_2 + 'Y' \xleftarrow[\text{HNO}_3]{\text{Conc.}} Cu \xrightarrow[\text{HNO}_3]{\text{dil}} Cu(NO_3)_2 + 'X' + H_2O$

X and Y condensed at low temperature to form 'Z'. The number of lone pairs in compound Z is