



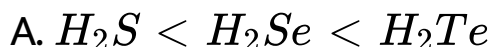
## CHEMISTRY

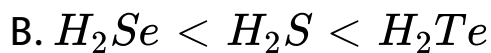
### BOOKS - SHARAM PUBLICATION

### GROUP 16 ELEMENTS (OXYGEN FAMILY)

#### Exercise

1. Acidity of diprotic acids in aqueous solution increases in the order





**Answer:**



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2. Roasting of sulphides gives the gas 'x' which is colourless with choking smell of burning sulphur and causes great damage to respiratory organs because of its acidic nature. It also acts a reducing agent . The gas 'x' is

A.  $CO_2$

B.  $SO_3$

C.  $H_2S$

D.  $SO_2$

**Answer:**



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3. Hot Conc.  $H_2SO_4$  acts as a moderately strong oxidising agents and oxides both metals and non-metals. Which of the following element is oxidised by Conc.  $H_2SO_4$  into two gaseous products ?

A.  $Cu$

B.  $S$

C.  $C$

D.  $Zn$

**Answer:**



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4. When formic acid is heated with conc.  $H_2SO_4$  the gas evolved is :

A. Only  $CO_2$

B. only  $CO$

C. a mixture of  $CO$  and  $H_2O$

D. a mixture of  $SO_2$  and  $CO_2$

**Answer:**

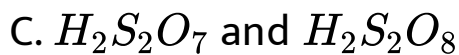


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5. Which of the following are the peroxo acids of sulphur ?

A.  $H_2SO_4$  and  $H_2S_2O_8$

B.  $H_2SO_5$  and  $H_2S_2O_8$

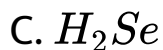


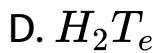
**Answer:**



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6. Which of the following hydride of Gr 16 show lowest boiling point ?



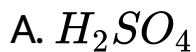


**Answer:**



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7. Which the following is known as king of chemicals?



**Answer:**



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8. When  $SO_2$  is passed through a solution of  $H_2S$  in water

- A.  $H_2SO_5$  is produced
- B.  $H_2SO_3$  is produced
- C. Sulphur is precipitated
- D. none of the above

**Answer:**





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9. Which will liberate  $H_2$  gas from dil.  $H_2SO_4$ ?

A.  $Cu$

B.  $Al$

C.  $ZnO$

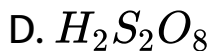
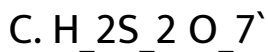
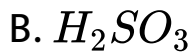
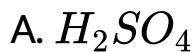
D.  $Ag$

**Answer:**



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10. Oil of vitriol is

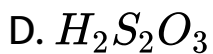


**Answer:**



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11. Anhydride of  $H_2SO_4$  is

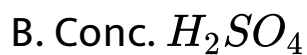


**Answer:**



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12.  $SO_2$  is dehydrated by



C.  $P_2O_5$

D. Anh.  $CaCl_2$

**Answer:**



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**13.** Bleaching action of Sulphur dioxide is due to

A. Oxidation

B. Reduction

C. Hydrolysis

D. Acidic nature

**Answer:**



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**14.** Which of the following has the maximum catenation property?

A. *S*

B. *Se*

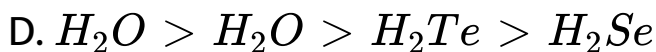
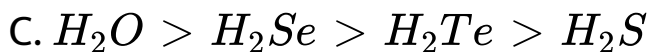
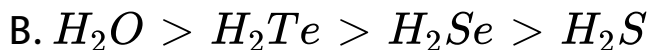
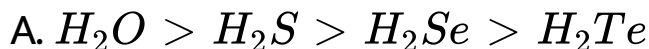
C. *Te*

D. *Po*

**Answer:**

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15. The decreasing order of boiling point is



**Answer:**

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16.  $H_2SO_4$  has greater affinity for water because

- A. it hydrolyses the acid
- B. decomposes the acid
- C. Acid forms hydrates with water
- D. Acid decomposes water

**Answer:**



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17. When  $H_2S$  is passed through acidified  $CuSO_4$  solution, a black precipitate is formed due to

A. Oxidation of  $Cu^2 +$

B. Reduction of  $Cu^2 +$

C. Reduction and oxidation of  $Cu^2 +$

D. Neither reduction or oxidation of  $Cu^2 +$

**Answer:**



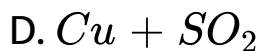
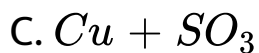
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**18.** Heating a mixture of  $Cu_2O$  and  $Cu_2S$  will give

A.  $Cu_2SO_3$

B.  $CuO + CuS$





**Answer:**



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**19.** How many atoms are packed differently in cyclic form in an allotrope of monoclinic sulphur ?

A. 6

B. 8

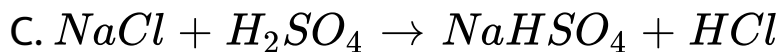
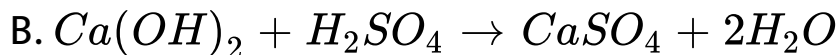
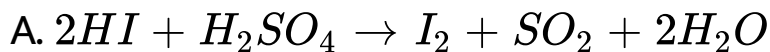
C. 2

**Answer:**



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20. Which reaction represents the oxidizing behaviour of  $H_2SO_4$  ?



D.

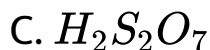
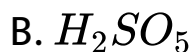
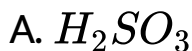


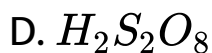
**Answer:**



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21. Sulphur trioxide gas when dissolve in  $\text{H}_2\text{SO}_4$  the product formed is





**Answer:**



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22. Which of the following statement regarding sulphur is correct ?

A.  $S_2$  is paramagnetic

B. The vapour of sulphur at  $200^\circ C$  consists mostly  $S_8$  rings

C. At  $600^{\circ}\text{C}$ , the gas mainly consists of  $\text{S}_2$  molecules

D. The oxidation state of sulphur is never less than  $+4$  in its compounds

**Answer:**



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**23.** Which of the following has a largest size ?

A.  $\text{S}^{2-}$

B.  $\text{Se}^{2-}$

C.  $O^2$  –

D.  $Te^2$  –

**Answer:**



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**24.** The angular shape of Ozone molecule consists of

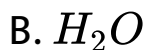
- A. 1 sigma and 1 pi- bond
- B. 2 sigma and 1 pi- bond
- C. 1 sigma and 2 pi- bonds
- D. 2 sigma and 2 pi- bonds

**Answer:**



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25. Which of the following compound has the smallest bond angle in the molecule ?



**Answer:**



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26. When natural rubber is heated with sulphur , it is called

- A. Vulcanisation
- B. Sulphonation
- C. Sulphurization
- D. none of these

**Answer:**



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27. When a lead storage battery is discharged:

- A.  $SO_2$  is evolved
- B.  $PbSO_4$  is consumed
- C. Lead is formed
- D.  $H_2SO_4$  is consumed

**Answer:**



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28. Which would quickly absorb oxygen ?

A. Lime water

B. Conc.  $H_2SO_4$

C. Alkaline  $CuSO_4$  solution

D. Alkaline pyrogallol solution

**Answer:**



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**29.** In which of the following reactions does  $SO_2$  act as an oxidising agent?

A. Acidifies  $KMnO_4$

B. Acidified  $K_2Cr_2O_7$

C. Acidified  $C_2H_5OH$

D.  $H_2S$

**Answer:**



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**30.** Which oxide on heating gives oxygen

A.  $HgO$

B.  $Na_2O$

C.  $BaO$

D.  $MgO$

**Answer:**



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**31.** Ozone is tested by

A.  $Ag$

B.  $Hg$

C.  $Zn$

D.  $Au$

**Answer:**



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**32.** Oleum is a mixture of:

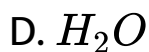
- A. Cost or oil
- B. Oil of vitriol
- C. Fuming  $H_2SO_4$
- D. none of these

**Answer:**



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33. Which of the following substance has the highest proton affinity ?

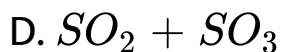


**Answer:**



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34. When Conc.  $H_2SO_4$  is heated with  $P_2O_5$  the acid is converted into

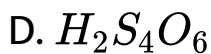
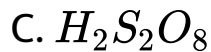
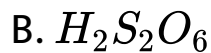
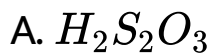


**Answer:**



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35. The acid having O-O bond is



**Answer:**



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**36.** Which acts both as an oxidising as well as reducing agent ?





B.  $MnO_2$

C.  $Al_2O_3$

D.  $CrO_3$

**Answer:**



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**37. Dry bleaching is done by:**

A.  $O_3$

B.  $H_2O_2$

C.  $Cl_2$

D.  $SO_2$

**Answer:**



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**38.** Which of the following elements of oxygen family is most poisonous to human race ?

A.  $O$

B.  $S$

C.  $Se$

D. None of these

**Answer:**



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**39.** Sulphur dioxide gas does not act as

- A. bleaching agent
- B. Oxidising agent
- C. reducing agent
- D. dehydrating agent

**Answer:**



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40.  $SO_2$  reacts with  $Cl_2$  to yield:

A. Sulphuryl Chloride

B. Sulphonyl Chloride

C.  $SO_2$

D. None of these

**Answer:**



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41. Identify the incorrect statement among the following.

A. Ozone reacts with  $SO_2$  to give  $SO_3$

B. Silicon reacts with *aq. NaOH* in presence of air to give  $NaSiO_3$  and  $H_2O$

C.  $Cl_2$  reacts with excess ammonia to give  $N_2$  and  $HCl$

D.  $Br_2$  reacts with hot and strong  $NaOH$  solution to give  $NaBr$ ,  $NaBrO_4$  and  $H_2O$

**Answer:**





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42. The acid having peroxide linkage is

- A. Caro 's acid
- B. Pyrosulphuric acid
- C. peroxy disulphuric acid
- D. Dithionic acid

**Answer:**



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43. A gas which cannot be collected over water is



**Answer:**



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44. Which gas is used to improve the atmosphere of crowded places:

A. bleaching power

B.  $O_2$

C.  $O_3$

D. Chlorine water

**Answer:**



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**45.** Which of the following is most abundant in the earth crust ?

A.  $O$



B.  $S$

C.  $Si$

D.  $C$

**Answer:**



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**46.** Anhydride of pyrosulphuric acid is

A.  $SO_2$

B.  $S_2O_3$

C.  $SO_3$

D.  $S_2O_7$

**Answer:**



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**47.** Oxygen exhibits positive oxidation state with:

A.  $F$

B.  $Br$

C.  $Cl$

D.  $I$

**Answer:**



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**48.** Normality of pure sulphuric acid is:

A. 4

B. 12

C. 24

D. 36

**Answer:**



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49. Oxygen will react with each of the following elements readily, except

A.  $P$

B.  $Na$

C.  $S$

D.  $Cl_2$

**Answer:**



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50. Cane sugar chars on treating with Conc.  $H_2SO_4$

because  $H_2SO_4$  is

- A. Oxidising agent
- B. Dehydrating agent
- C. An acid
- D. A catalyst

**Answer:**



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51. Which oxide of sulphur can act as an oxidising as well as reducing agent?



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52. What is the shape of sulphur dioxide ?



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53. Write the allotropic forms of sulphur.



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**54.** Which acid is used in lead accumulators ?

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**55.** Which are the members of Gr -16 known as chalcogens.

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**56.** How does oxygen differ from sulphur ?

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57. Why  $SO_2$  gas cannot be collected over water?

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58. Which oxide of oxygen family is amphoteric in nature?

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59. The catalyst used in the manufacture of sulphuric acid by contact process is:

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60. Give one reaction in which  $SO_2$  behaves as a reducing agent.



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61. What is the action of  $SO_2$  with  $H_2S$ ?



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62. What is the colour change observed when  $SO_2$  is passed through acidified  $K_2Cr_2O_7$  solution?



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63. What is the action of  $O_3$  on Mercury ?

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64. What do you mean by tailing of mercury ?

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65. Give one reaction in which  $H_2SO_4$  acts as a dehydrating agent .

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**66.** Arrange the hydrides of Gr 16 elements with increasing order of their reducing power ?

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**67.** Which are the anhydrides of sulphurous acid and sulphuric acid ?

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**68.** Write the allotropic forms of oxygen .

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**69.** In which elements of oxygen family the +6 oxidation state is least stable.

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**70.** What are the different oxidation states of oxygen ?

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**71.** Arrange the hydrides of elements of oxygen family in the increasing order of their volatility ?



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72. Which catalyst is used in the preparation of oxygen from potassium chlorate ?



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73. Between  $O_2$  and  $O_3$  which is paramagnetic ?



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74. What is Oleum ? Write its formula.



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**75.** What are the reactions involved for ozone layer depletion in the atmosphere ?

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**76.** Name the allotrope of oxygen, which is used as a disinfectant and a germicide.

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77. Which gas is liberated when metallic copper reacts with Conc.  $H_2SO_4$  ?



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78. Which gas is liberated when Zinc reacts with Conc.  $H_2SO_4$  ?



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79. Between  $SO_2$  and  $SO_3$  which one acts as the reducing agent ?



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80. Bleaching properties of bleaching powder are due to its:

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81. Fill in the blanks :Ozone reacts with stannous chloride and  $HCl$  to form ..... And.....

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82. Fill in the blanks :When sulphuric acid is dehydrated ..... Is formed.



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83. Fill in the blanks :Hydrogen sulphide reduces hot conc.  $H_2SO_4$  to .....



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84. Tailing of mercury is due to formation of \_\_\_\_\_.



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85. Fill in the blanks :The black substance left when Conc.  $H_2SO_4$  is added to cane sugar is .....

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86. Fill in the blanks :Sulphur acts as ..... In vulcanization of rubber.

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87. Fill in the blanks : $H_2S$  gas is dried by passing through .....



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88. Fill in the blanks :..... gas is formed when iron sulphide reacts with conc.  $H_2SO_4$ .



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89. Fill in the blanks : ..... Is evolved when non-metals are heated with conc.  $H_2SO_4$ .



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90. The most stable allotropic form of sulphur is:

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91. Fill in the blanks :The dehydration property of conc. $H_2SO_4$  is due to the formation of ..... With water.

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92. Fill in the blanks :Ozone is absorbed by .....

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93. Fill in the blanks :Ozone oxides iodine to .....

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94. Fill in the blanks :The maximum covalency of sulphur is .....

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95. Fill in the blanks :When a lead acetate paper is shown to  $H_2S$  gas it turns ..... Due to formation of .....



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96. The thermal stability of the hydrides of group 16  
..... down the group.



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97. Fill in the blanks :  $SO_2$  gas is purified by passing  
it over .....



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98. Fill in the blanks :The formula of hypo is .....

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99. Fill in the blanks :The number of unpaired electrons present in the sulphur atom is .....

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100. Fill in the blanks :..... Gas is librated when ozone reacts with  $KI$  solutions.

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**101.** Which acid is formed when sulphur dioxide dissolves in water ? Write its name and chemical formula ?



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**102.** Fill in the blanks :Between  $H_2O$  and  $H_2S$  , the bp of ..... Is more due to .....



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**103.** Fill in the blanks :Dilute sulphuric acid reacts with metals liberating ..... gas.



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**104.** Fill in the blanks :Ozone bleaches colouring matter by .....



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**105.** Fill in the blanks :When  $SO_2$  is passed through lime water ..... is formed, for which the solution

becomes milky .

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**106.** What happens when  $SO_2$  gas is passed through acidified  $KMnO_4$  solution ?

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**107.** Fill in the blanks :Ozone reacts with ethylene to form .....

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108.  $SF_6$  exists while  $OF_6$  does not. Explain.

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109. Fill in the blanks :The general electronic configuration of valence shell electrons of Gr 16 elements are .....

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110. What happens when  $H_2S$  gas is passed through chlorine water ?

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111. Complete the reaction.  $SnCl_2 + HCl + O_3 \rightarrow$

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112. Why hydrogen sulphide cannot be dried by conc.  $H_2SO_4$ ?

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113. How does ozone react with moist iodine?

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**114.** How does sulphur dioxides bleaches vegetable colouring matter ?



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**115.** How would you account for the following? The electron gain enthalpy with negative sign is less for oxygen than that of sulphur.



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**116.** How would you account for the following? The electron gain enthalpy with negative sign is less for oxygen than that of sulphur.

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**117.** Why is a compound of oxygen and fluorine is called as oxygen difluoride ?

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118. Why  $OF_2$  should be called oxygen difluoride and not fluorine oxide ?

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119. The catenating tendency for sulphur is more than that of oxygen . Why ?

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120.  $SF_6$  is known but  $SCl_6$  is not. Why?

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**121.**  $H_2S$  acts only as a reducing agent but  $SO_2$  acts as a reducing as well as oxidising agent. Why?

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**122.** Why is  $H_2S$  more acidic than water ?

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**123.** Oxygen is more electronegative than sulphur, yet  $H_2S$  is acidic while  $H_2O$  is neutral. This is because:





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**124.** How does Nitric oxide emitted from the exhaust of Supersonic jet aeroplanes deplete the ozone layer in the upper atmosphere ?



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**125.** Elements of Gr 16 generally show lower value of 1st ionization enthalpy compared to the corresponding elements of Gr 15. Why ?



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126. What happens when Con. $H_2SO_4$  is added to  $CaF_2$  ?

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127. Write the increasing order of thermal stability of hydrides of Gr-16 elements.

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128. Why is  $H_2O$  liquid and  $H_2S$  a gas ?

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**129.** Why does ozone act as a powerful oxidising agent?

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**130.** What happens when Sulphur dioxide is passed through  $FeCl_3$  solution ?

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**131.** Write three important applications  $H_2SO_4$ .

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**132.** Write the conditions to maximise the yield of sulphuric acid by contact process.



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**133.** What is inert pair effect ?



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**134.** Why are Gr 16 elements called chalcogens ?



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135. Why  $OF_6$  does not exist but  $SF_6$  exists ?

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136. Arrange the following in order of increasing acid character.  $H_2O$ ,  $H_2S$ ,  $H_2Se$ ,  $H_2Te$ .

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137. What is charring of sugar ?

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**138.** What happens when  $SO_2$  gas is passed through acidified  $K_2Cr_2O_7$  solution ?

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**139.** Why does  $SO_2$  act as a bleaching agent and is temporary ?

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**140.** Write one oxidising property of Sulphur dioxide.



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141. Give one reaction in which  $H_2SO_4$  acts as a dehydrating agent .



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142. Arrange the following in order of increasing acid character.  $H_2O$ ,  $H_2S$ ,  $H_2Se$ ,  $H_2Te$ .



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**143.** Give a comparative account of Gr 16 elements of periodic table.



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**144.** Discuss the general trend in physical and chemical properties of Gr 16 elements.



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**145.** Write the principles of manufacture of sulphuric acid by contact process ? What happens



when Conc. $H_2SO_4$  reacts with

sodium bromide



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**146.** What happens when Conc. $H_2SO_4$  reacts with Ethyl alcohol.



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**147.** How does Sulphur dioxide react with acidified  $KMnO_4$  solution.



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**148.** How is sulphur dioxide prepared in the laboratory? How does it react with lime water



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**149.** How is sulphur dioxide prepared in the laboratory? How does it react with hot Mg ribbon



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**150.** Discuss contact process for manufacture of Conc.  $H_2SO_4$ . Write its reaction with  $HBr$

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**151.** Discuss contact process for manufacture of Conc.  $H_2SO_4$ . Write its reaction with Metallic copper

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**152.** Discuss contact process for manufacture of Conc.  $H_2SO_4$ . Write its reaction with benzene

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**153.** Write notes on : Anomalous behaviour of oxygen

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**154.** Write notes on : Allotropes of sulphur





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