CHEMISTRY

BOOKS - A N EXCEL PUBLICATION

P-BLOCK ELEMENTS

Question Bank

1. Why are pentahalides more covalent than trihalides?

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2. Why is BiH_3 the strongest reducing agent among all the hydrides- of group 15 elements?

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3. Why is N_2 less reactive at room temperature?

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4. The principle goal of chemical synthesis is to maximize the conversion of reactants into products. Le-Chatlier's principle can be applied to achieve this

goal.

Preidct the conditions to be applied to maximize the production of ammonia in the following reaction:

$N_{2(g)} + 3H_{2(g)} \Leftrightarrow 2NH_{3(g)} \Delta H = -92.38 kjmol^{-1}$

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5. How does ammonia react with a solution of Cu^{2+} ?

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6. What is the covalence of nitrogen in N_2O_5?

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7. Bond angle in is PH_4^+ higher than that in PH_3

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8. What happens when white phosphorus is heated with NaOH solution in an inert atmosphere of CO_2 ?

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9. What happens when PCl_5 is heated?

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10. Write balanced equation for the hydrolytic reaction of PCl_5 with heavy water?

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11. What is the basicity of H_3PO_4?

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12. What happens when H_3PO_3 is heated?

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13. List the important sources of sulphur

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14. Write the order thermal stability of the hydrides of group-16 elements

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15. H_2S is a gas at ordinary condition, while H_2O is liquid. Account for the above statement.

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16. Which of the following does not react with O_2 directly Zn, Ti,Pt, Fe?

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17. Complete the following reactions?

$C_2H_4 + O_2 \rightarrow$

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18. Complete the following reactions? '4Al+3O_2`

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19. Why does ozone act as a powerful oxidising agent?

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20. Suggests method for the quantitative estimation of ozone (O_3).

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21. What happens when SO_2 is passed through an aqueous solution of Fe (III) salt?

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22. Comment on the nature of two S-O bonds in SO_2 molecule. Are the two S:O bonds in this molecule equal?

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23. How is the presence of SO_2 detected?

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24. Mention three areas in which H_2SO_4plays an important role.

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25. Write the conditions to maximise the yield of H_2SO_4 in contact process.

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26. Why is Ka_2 less than Ka_1 for H_2SO_4 in water.?

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27. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidising power of F_2 and Cl_2.

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28. Give two examples to show the anomalous behaviour of fluorine.

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29. Sea is the greatest source of halogens. Comment.

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30. Give the reason for the bleaching property of chlorine.

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31. Name two poisonous gases that can be prepared from chlorine gas

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32. Why is ICl more reactive than I_2 ?

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33. Why is helium used in diving apparatus?

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34. Why has it been difficult to study the chemistry of radon?

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35. Elements in the groups 13 to .18 in the periodic table constitute the ‘p’ block elements. Name the most important oxo acid of nitrogen

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36. Elements in the groups 13 to .18 in the periodic table constitute the ‘p’ block elements. How will you. prepare the above oxo acid on large scale?

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37. Elements in the groups 13 to .18 in the' periodic table constitute the ‘p’ block elements. In general, noble gases are least reactive. Why?

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38. After a discussion about the structures of hydrides of group-15 elements, .Neethu wrote the order of bond angles as $NH_3 < PH_3 < AsH_3$. Is this the correct order?

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39. After a discussion about the structures of hydrides of group-15 elements, .Neethu wrote the order of bond angles as $NH_3 < PH_3 < AsH_3$. Justify 'your answer:

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40. After a discussion about the structures of hydrides of group-15 elements, .Neethu wrote the order of bond angles as $NH_3 < PH_3 < AsH_3$. Give the hybridization and shape of these hydrides.

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41. After a discussion about the structures of hydrides of group-15 elements, .Neethu wrote the order of bond angles as $NH_3 < PH_3 < AsH_3$. Also arrange the above hydrides in the increasing order of their thermal stability. Justify your answer.

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42. Discovery, of Haber's process for manufacture of ammonia is considered to be one of the principal discoveries of twentieth century. Which is the promoter used in the earlier process when iron was used as catalyst?

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43. Discovery, of Haber's process for manufacture of ammonia is considered to be one of the principal discoveries of twentieth century. What is the

temperature condition for maximum yield of ammonia? Justify.

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44. Discovery, of Haber's process for manufacture of ammonia is considered to be one of the principal discoveries of twentieth century. Explain how can you convert NH_3 to HNO_3 on a large scale commercially.

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45. Phosphorus of group-15 and sulphur of group-16 are two industrially important 'p' block elements Their, compounds are also industrially important. $4H_3PO_3 \xrightarrow{\text{heat}} 3H_3PO_4 + PH_3$. show that this is a disproportionation reaction

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46. Phosphorus of group-15 and sulphur of group-16 are two industrially important 'p' block elements Their, compounds are also industrially important. PCl_3 fumes in moisture. Give reason.

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47. Phosphorus of group-15 and sulphur of group-16 are two industrially important 'p' block elements Their, compounds are also industrially important. Sulphuric acid can be manufactured from sulphur using V_{20}_5 catalyst., Give the name of the method.

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48. Phosphorus of group-15 and sulphur of group-16 are two industrially important 'p' block elements Their, compounds are also industrially important.

Sulphuric acid can be manufactured from sulphur using V_{20} _ 5 catalyst., Outline the principle

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49. Important allotropic forms of phosphorus are white phosphorus, red phosphorus and black phosphorus. Among these, which allotropic' form is more reactive? Why

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50. In the manufacture of sulphuric acid (H_2SO_4), the final product obtained is oleum. What is oleum?

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51. In the manufacture of sulphuric acid (H_2SO_4), the final product obtained is oleum. Write chemical equation for the conversion of oleum to sulphuric acid.

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52. Name the halogen-which forms only one oxo acid and also write the formula of the oxo acid of that halogen.

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53. Which element among inert gases form, maximum number of compounds? Write the formula of one of the compounds formed by the element.

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54. What are the products obtained when copper reacts with concentrated nitric acid?

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55. Name two important xenon fluorides.

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56. Give the structure of the above xenon fluorides. .

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57. Interhalogen compounds are compounds formed by combination of different halogen atoms. Which are more reactive, halogens or interhalogen compounds? Give reason

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58. Nitrogen forms number of oxides in the different oxidation states. Write the names and structural formulae of any four oxides of nitrogen.

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59. Boiling point of H_2O (373K) is very much higher than that of H_2S (213 K). Give reason.

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60. Suggests method for the quantitative estimation of ozone (O_3).

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61. What are the products obtained when copper reacts with concentrated nitric acid?

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62. Write down the chemical reaction between concentrated nitric acid and aluminium.

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63. What is the basicity of H_3PO_3?

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64. How do you account for the basicity of

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65. Write down the main three steps involved in the manufacture of sulphuric. acid by the contact process.

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66. Write any two important uses of noble gas elements.

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67. Compounds of nitrogen, phosphorus and sulphur such as ammonia, phosphoric acid and sulphuric acid are used in fertilizer industry. Describe Haber process for the manufacture of ammonia.

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68. Compounds of nitrogen, phosphorus and sulphur such as ammonia, phosphoric acid and sulphuric acid are used in fertilizer industry. Write the chemical equation for the preparation of phosphoric acid (H_3PO_4) from H_3PO_3

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69. Write down the main three steps involved in the manufacture of sulphuric. acid by the contact process.

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70. Ammonia and Nitric acid are two industrially important compounds. Write any two uses of ammonia.

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71. Ammonia and Nitric acid are two industrially important compounds. Complete the following equations. (Balancing is not required)

$$NH_3 + o_2 \xrightarrow[500K, 9\text{bar}]{pt}$$

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72. Ammonia and Nitric acid are two industrially important compounds. Complete the following equations. (Balancing is not required)

$$Cu + con.\ HNO_3 \rightarrow$$

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73. Ammonia and Nitric acid are two industrially important compounds. Complete the following equations. (Balancing is not required) $Zn + dil.\ HNO_3 \rightarrow$

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74. Ammonia and Nitric acid are two industrially important compounds. Complete the following equations. (Balancing is not required) $NH_3 +$ excess $Cl_2$to

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75. Ammonia and Nitric acid are two industrially important compounds. Phosphorus forms a number of oxoacids.. Write the name or formulae of any two oxoacids. of phosphorus.

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76. Ammonia and Nitric acid are two industrially important compounds. Account for the following: PCl_5 fumes in moist air

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77. Ammonia and Nitric acid are two industrially important compounds. Account for the following: Nitrogen does not form a pentahalide.,

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78. Ammonia and Nitric acid are two industrially important compounds. Account for the following: Boiling point of PH_3 is less than. that of NH_3

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79. Ammonia and Nitric acid are two industrially important compounds. Account for the following: NO_2 undergoes dimerisation.

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80. Some elements in p-block shows allotropy. What are the allotropic forms of sulphur?

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81. Some elements in p-block shows allotropy. How will-you manufacture Sulphuric Acid by contact process?

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82. Some elements in p-block shows allotropy. What are inter halogen compounds?

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83. Some elements in p-block shows allotropy. Name two oxoacids of Sulphur.

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84. Some elements in p-block shows allotropy. How will you manufacture ammonia by Haber process?

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85. Some elements in p-block shows allotropy. Write any two uses of inert gases.

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86. What are interhalogen compounds? Write any two examples.

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87. Write a method of preparation of phosphine from white phosphorus

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88. Write the. name or formula of oxo acid of chlorine, in which chlorine has oxidation number $+7$

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89. Draw the structures of $XeO_3$and XeF_6

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90. Account for the following: NH_3acts-as a Lewis base.

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91. PCl_3 fumes in moist air. Give reason.

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92. Account for the following: Fluorine shows only-1 oxidation state.

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93. Suggest any two fluorides of Xenon

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94. Write a method to prepare any one of the above mentioned X Xenon fluorides. “

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95. H_2S is a gas at ordinary condition, while H_2O is liquid. Account for the above statement.

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96. Account for the following: Noble gases have very low boiling points.

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97. Ammonia and Nitric acid are two industrially important compounds. Account for the following: NO_2 undergoes dimerisation.

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98. Give the structure of the above xenon fluorides. .

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99. Write a method to prepare any one of the Xenon fluorides

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100. Nitrogen shows different oxidation states in different oxides. In which of the following oxides, nitrogen is in $+4$ oxidation state? NO, N_2O, N_2O_3, NO_2

A. NO

B. N_2O

C. N_2O_3

D. NO_2

Answer: B

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101. Nitrogen shows .different oxidation states in different oxides. Prepare a short write up on Nitric acid highlighting its structure, manufacture and any two properties.

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102. In which of the following phosphorus is in $+1$ oxidation state?

A. H_3PO_2

B. H_3PO_3

C. $H_4P_2O_7$

D. H_3PO_4

Answer: B::C

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103. Nitrogen shows .different oxidation states in different oxides. Prepare a short write up on Ammonia highlighting its structure, manufacture and properties.

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104. Nitrogen forms a number of oxides and oxoacids. Which of the following is a neutral oxide of Nitrogen? $N_2O, N_2O_5, NO_2, N_2O_4$

A. N_2O

B. N_2O_5

C. NO_2

D. N_2O_4

Answer: B

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105. Nitrogen forms a number of oxides and oxoacids. Prepare a short write-up on Nitric acid highlighting its laboratory preparation, chemical properties and uses.

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106. Nitrogen forms a number of oxides and oxoacids. The gas liberated when calcium phosphide is treated with dil. HCI is

A. Cl_2

B. H_2

C. PH_3

D. All the above

Answer: C

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107. Nitrogen forms a number of oxides and oxoacids. Prepare a short write up on PCl_3 and PCl_4 highlghting the preparation and chemial properties of PCl_5 and structure of PCl_5.

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108. Identify the least basic compound among the following:

A. H_2O

B. H_2S

C. H_2Se

D. H_2Te

Answer: B

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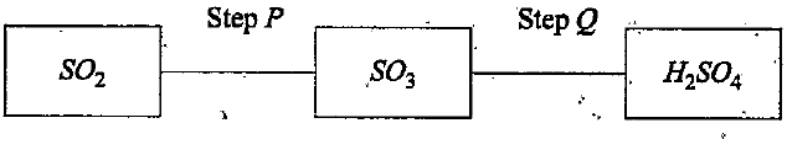
109. Explain the step P and Q.



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110. Give a reaction which indicates dehydration property of con. H_2SO_4

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111. Write any two uses of sulphuric acid.

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112. Identify the least basic compound among the following:

A. NH_3

B. PH_3

C. AsH_3

D. SbH_3

Answer: B::C

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113. Which of the following will have the most negative electron gain enthalpy and which the least negative ?

P,S,Cl,F. Explain your answer.

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114. Draw the structure of perchloric acid $(HClO_4)$

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115. What are interhalogen compounds? Write any two examples.

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116. Ozone is an allotrope of oxygen. The ozone layer present at the upper part of the atmosphere protects the earth's surface from excess UV

radiation. Why does O_3 act as a strong oxidising agent?.

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117. Ozone is an allotrope of oxygen. The ozone layer present at the upper part of the atmosphere protects the earth's surface from excess UV radiation. Why does black lead sulphide become white, on treating with ozone?

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118. Suggests method for the quantitative estimation of ozone (O_3).

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119. .Name two compounds that can cause depletion of the ozone layer in the upper atmosphere

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120. Nitrogen forms a number of oxides in which the oxidation state of TV varies from $+1$ to $+5$. Which

oxides of nitrogen are paramagnetic?

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121. Ammonia and Nitric acid are two industrially important compounds. Account for the following: NO_2 undergoes dimerisation.

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122. Which oxide contains N-O-N bond? Draw its structure.

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