



CHEMISTRY

BOOKS - NCERT CHEMISTRY (ENGLISH)

GENERAL PRINCIPLE AND PROCESSES OF ISOLATION OF ELEMENTS

Multiple Choice Questions

1. In the extraction of chlorine by electrolysis of brine_____.

A. oxidation of Cl^- ion to chlorine gas occurs

B. reduction of Cl^- ion to chlorine gas occurs

C. for overall reaction ΔG^\ominus has negative value

D. a displacement reaction takes place

Answer: A



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2. When copper ore is mixed with silica in a reverberatory furnace, copper matte is produced. The copper matter contains _____

A. sulphide of copper (II) and iron (II)

B. sulphide of copper (II) and iron (III)

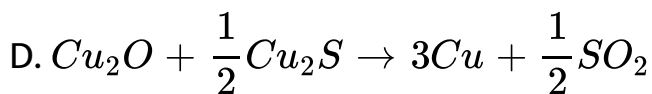
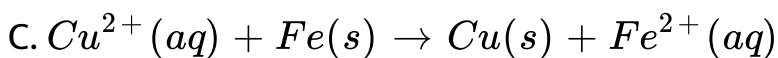
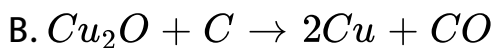
C. sulphide of copper (I) and iron (II)

D. sulphide of copper (II) and iron (I)

Answer: C

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3. Which of the following reaction is an example of autoreduction?



Answer: D

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4. A number of elements are available in earth's crust but most abundant elements are _____

- A. Al and Fe
- B. Al and Cu
- C. Fe and Cu
- D. Cu and Ag

Answer: A



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5. Zone refining is based on the principle that

- A. impurities of low boiling metal can be separated by distillation.
- B. impurities are more soluble in molten metal than in solid metal.
- C. different components of a mixture are differently adsorbed on an adsorbent
- D. vapours of volatile compound can be decomposed to pure metal.

Answer: B



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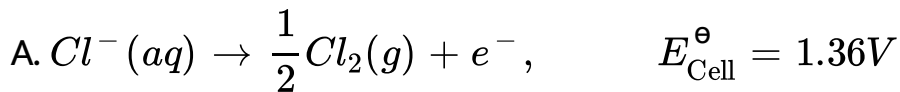
6. In the extraction of Cu from its sulphide ore, the metal is formed by reduction of Cu_2O with

- A. FeS
- B. CO
- C. Cu_2S
- D. SO_2

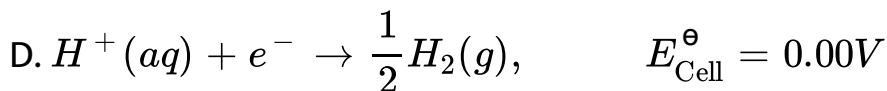
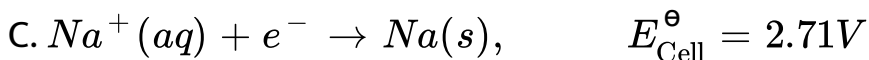
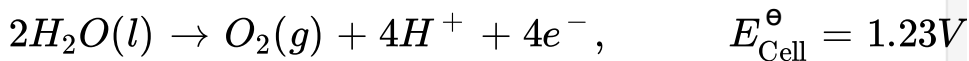
Answer: C

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7. Brine is electrolysed by using inert electrodes. The reaction at anode is_____



B.



Answer: A

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8. In the metallurgy of aluminium,

A. Al^{3+} is oxidized to Al (s).

B. graphide anode is oxidation to carbon monoxide and carbon dioxide.

C. oxidation state of oxygen changes in the reaction at anode.

D. oxidation state of oxygen in the overall reaction changes in the process.

Answer: B

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9. Elecyroltic refining is used to purify which of the following metals?

A. Cu and Zn

B. Ge and Si

C. Zr and Ti

D. Zn and Hg

Answer: A



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10. Extraction of gold and silver involves leaching the metal with CN^- ion. The metal is recovered by _____

A. displacement of metal by some metal from the complex ion.

B. roasting of metal complex

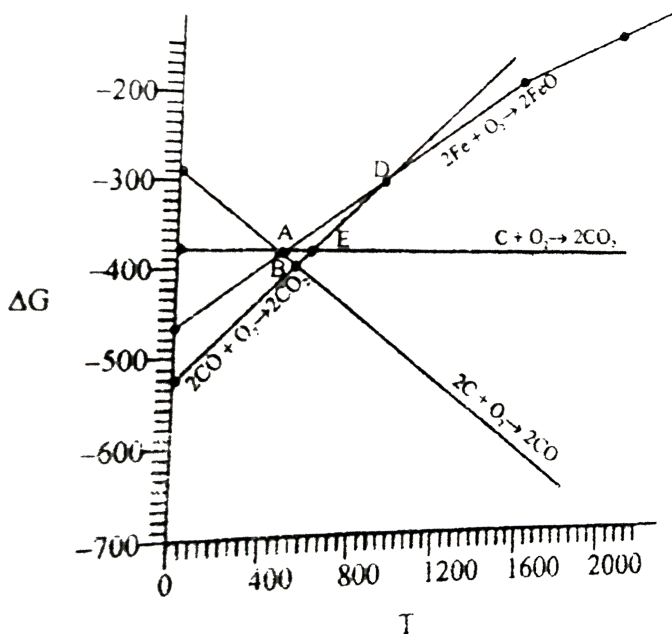
C. calcination followed by roasting

D. thermal decomposition of metal complex

Answer: A

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11. Choose the correct option of temperature at which carbon reduced FeO to iron and produces CO



A. Below temperature at point A

B. Approximately at the temperature corresponding to point A

C. Above temperature at point A but below temperature at point D

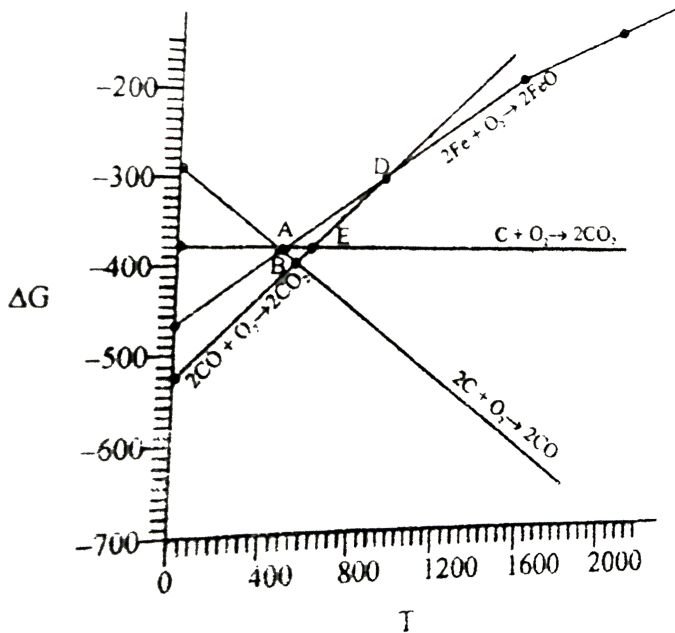
D. Above temperature at point A

Answer: D



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12. Below point 'A' FeO can _____



(a) be reduced by carbon monoxide only.

(b) Be reduced by both carbon monoxide and carbon.

(c) be reduced by carbon only

(d) not be reduced by both carbon and carbon monoxide

A. be reduced by carbon monoxide only.

B. Be reduced by both carbon monoxide and carbon.

C. be reduced by carbon only

D. not be reduced by both carbon and carbon monoxide

Answer: A



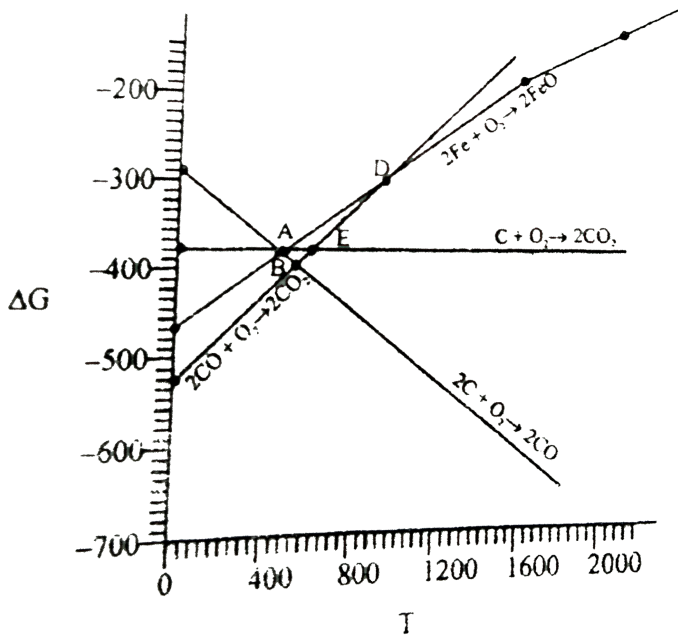
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13. For the reduction of FeO at the temperature corresponding to point D, which of the following

statements

is

correct?



- A. ΔG value for the overall reduction reaction with carbon monoxide is zero.
- B. ΔG value for the overall reduction reaction with a mixture of 1 mol carbon and 1 mol oxygen is positive
- C. ΔG value for overall reduction with a mixture of 2 mol carbon and 1 mol carbon and 1 mole oxygen will

be positive

D. ΔG value for the overall reduction with carbon monoxide is negative

Answer: A

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14. At the temperature corresponding to which of the points in Fig. FeO will be reduced to Fe by coupling the reaction $2Fe \rightarrow 2Fe + O_2$ with all of the following reactions?

(a) $C + O_2 \rightarrow CO_2$ (b) $2C + O_2 \rightarrow 2CO$ and (c)
 $2CO + O_2 \rightarrow 2CO_2$

Point A

Point B

Point D

Point E

A. Point A

B. Point B

C. Point D

D. Point E

Answer: B::D



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15. Which of the following options are correct?

- A. Cast iron is obtained by remelting pig iron with scrap iron and coke using hot air blast
- B. In extraction of silver, silver is extracted as cationic complex
- C. Nickel is purified by zone refining
- D. Zr and Ti are purified by van Arkel method

Answer: A::D

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16. In the extraction of aluminium by Hall-Heroult process purified Al_2O_3 is mixed with CaF_2 to

- A. lower the melting point of Al_3O_3

B. increase the conductivity of molten mixture

C. reduce Al^{3+} into Al(s)

D. acts as catalyst

Answer: A::B



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17. Which of the following statements is correct about the role of substances added in the froth floatation process?

A. Collectors enhance the non-wettability of the mineral particles

B. Collectors enhance the wettability of gangue particle

C. By using depressants in the process two sulphide ores can be separated.

D. Froth stabilisers decrease wettability of gangue

Answer: A::C

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18. In the Froth Floatation process, zinc sulphide and lead sulphide can be separated by_____

A. using collectors

B. adjusting the proportion of oil to water

C. using depressant

D. using froth stabilisers

Answer: B::C



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19. Common impurities present in bauxite are _____

A. CuO

B. ZnO

C. Fe_2O_3

D. SiO_3

Answer: C::D



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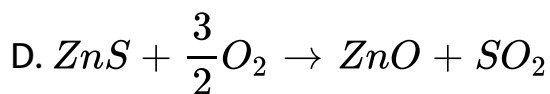
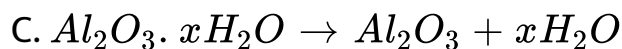
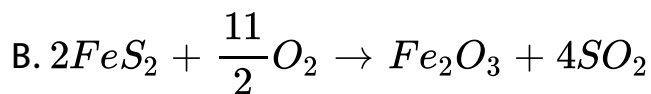
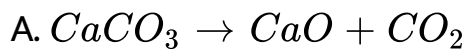
20. Which of the following ores are concentrated by froth floatation?

- A. Haematite
- B. Galena
- C. Copper pyrites
- D. Magnetite

Answer: B::C

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21. Which of the following reactions occur during calcination?



Answer: A::C



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22. For the metallurgical process of which of the ores calcined ore can be reduced by carbon?

A. Haematite

B. Calamine

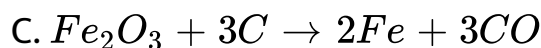
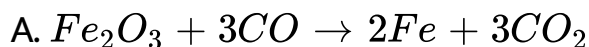
C. Iron pyrites

D. Sphalerite

Answer: A::B

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23. The main reaction occurring in blast furnace during the extraction of iron from haematite is



Answer: A::D



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24. In which of the following method of purification metal is converted to its volatile compound which is decomposed to give pure metal?

- A. Heating with stream of carbon monoxide
- B. Heating with iodine
- C. Liquation
- D. Distillation

Answer: A::B



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25. Which of the following statements are correct ?

A. A depressant prevents certain type of particle to come to the froth.

B. Copper matte contains Cu_2S and ZnS

C. The solidified copper obtained from reverberatory furnace has blistered appearance due to evolution of SO_2 during the extraction.

D. Zinc can be extracted by self-reduction.

Answer: A::C



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26. In the extraction of chlorine from brine _____

- A. ΔG^\ominus for the overall reaction is negative
- B. ΔG^\ominus for the overall reaction is positive
- C. E^\ominus for the overall reaction has negative value
- D. E^\ominus for the overall reaction has positive value

Answer: B::C

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Short Answer Type Question

1. Why is an external emf of more than $2.2V$ required for the extraction of Cl_2 from brine?

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2. At temperature above $1073K$ coke can be used to reduce FeO to Fe . How can you justify this reduction with Ellingham diagram?

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3. Wrought iron is the purest form of iron. Write a reaction used for the preparation of wrought iron from cast iron.

How can the impurities of sulphur, silicon and phosphorus be removed from cast iron?

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4. How is copper extracted from low grade copper ores?

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5. Write two basic requirements for refining of a metal by Mond process and by Van Arkel Method

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6. Although carbon and hydrogen are better reducing agents but they are not used to reduce metallic oxides at high temperatures. Why?

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7. How do we separate two sulphide ores by Froth Floatation Method? Explain with an example.

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8. The purest form of iron is prepared by oxidising impurities from cast iron in a reverberatory furnace. Which

iron ore is used to line the furnace? Explain by giving reaction.

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9. The mixture of compounds A and B is passed through a column of Al_2O_3 by using alcohol as eluent. Compound A is eluted in preference to compound B. Which of the compounds A or B is more readily adsorbed on the column?

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10. Why is sulphide ore of copper heated in a furnace after mixing with silica?

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11. Why are sulphide ores converted to oxide before reduction?

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12. Which method is used for refining Zr and Ti ? Explain with equation.

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13. What should be the considerations during the extraction of metals by electrochemical method?

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14. What is the role of flux in metallurgical processes?

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15. How are metals used as semiconductor refined? What is the principle of the method used?

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16. Write down the reactions taking place in Blast furnace related to the metallurgy of iron in the temperature range $500 - 800K$

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17. Give two requirements for vapour phase refining.



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18. Write the chemical reaction involved in the extraction of gold by cyanide process. Also give the role of zinc in the extraction.



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Matching The Columns

1. Match the items of Column I with item of Column II and assign the correct code.

Column I	Column II
A. Pendulum	1. Chrome steel
B. Malachite	2. Nickel steel
C. Calamine	3. Na_3AlF_6
D. Cryolite	4. $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
	5. ZnCO_3

A. *A B C D*
1 2 3 4

B. *A B C D*
2 4 5 3

C. *A B C D*
2 3 4 5

D. *A B C D*
4 5 3 2

Answer: A::B::C::D

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2. Match the items of Column I with item of Column II and assign the correct code.

Column I		Column II	
A.	Coloured bands	1.	Zone refining
B.	Impure metal to volatile complex	2.	Fractional distillation
C.	Purification of Ge and Si	3.	Mond's process
D.	Purification of mercury	4.	Chromatography
		5.	Liquation

A. $A \ B \ C \ D$
 1 2 4 5

B. $A \ B \ C \ D$
 4 3 1 2

C. $A \ B \ C \ D$
 3 4 2 1

D. $A \ B \ C \ D$
 5 4 3 2

Answer: A::B::C::D



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3. Match the items of Column I with item of Column II and assign the correct code.

Column I	Column II
A. Cyanide process	1. Ultrapure Ge
B. Froth floatation process	2. Dressing of ZnS
C. Electrolytic reduction	3. Extraction of Al
D. Zone refining	4. Extraction of Au
	5. Purification of Ni

A. $A \ B \ C \ D$
4 2 3 1

B. $A \ B \ C \ D$
2 3 1 5

C. $A \ B \ C \ D$
1 2 3 4

D. $A \ B \ C \ D$
3 4 5 1

Answer: A::B::C::D



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4. Match the items of Column I with item of Column II and assign the correct code.

Column I	Column II
A. Sapphire	1. Al_2O_3
B. Sphalerite	2. NaCN
C. Depressant	3. Co
D. Corundum	4. ZnS
	5. Fe_2O_3

A. *A B C D*
3 4 2 1

B. *A B C D*
5 4 3 2

C. *A B C D*
2 3 4 5

D. *A B C D*
1 2 3 4

Answer: A::B::C::D



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5. Match the items of Column I with item of Column II and assign the correct code.

Column I	Column II
A. Blistered Cu	1. Aluminium
B. Blast furnace	2. $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \longrightarrow 6\text{Cu} + \text{SO}_2$
C. Reverberatory furnace	3. Iron
D. Hall-Heroult process	4. $\text{FeO} + \text{SiO}_2 \longrightarrow \text{FeSiO}_3$
	5. $2\text{Cu}_2\text{S} + 3\text{O}_2 \longrightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$

A. $A \quad B \quad C \quad D$
 2 3 4 1

B. $A \quad B \quad C \quad D$
 1 2 3 5

C. $A \quad B \quad C \quad D$
 5 4 3 2

D. $A \quad B \quad C \quad D$
 4 5 3 2

Answer: A::B::C::D



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1. Assertion : Nickel can be purified by Mond process.

Reason : $Ni(CO)_4$ is a volatile compound which decomposed at $460K$ to give pure Ni .

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer: A



2. Assertion : Zirconium can be purified by Van Arkel method.

Reason : ZrI_4 is volatile and decomposed at $1800K$.

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer: A



3. Assertion : Sulphide ores are concentrated by Froth Floatation method.

Reason : Cresols stabilise the froth in Froth Floatation method

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer: B



4. Assertion : Zone refining method is very useful for producing semiconductors.

Reason : Semiconductors are of high purity.

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer: B



5. Assertion : Hydrometallurgy involves dissolving the ore in a suitable reagent followed by precipitation by a more electropositive metal.

Reason : Copper is extracted by hydrometallurgy.

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true.

Answer: B



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Long Answer Type Questions

1. Explain the following

(a) Generally sulphide ores are converted into oxides before reduction.

(b) Silica is added to the sulphide ore of copper in the reverberatory furnace.



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