



CHEMISTRY

BOOKS - IIT-JEE PREVIOUS YEAR (CHEMISTRY)

S BLOCK ELEMENTS

Jee Main And Advanced

1. Both lithium and magnesium display several similar properties due to the diagonal

relationship, however, the one which is incorrect is

- A. Both form basic carbonates
- B. Both form soluble bicarbonates
- C. Both form nitrides
- D. nitrates of both Li and Mg yield NO_2 and O_2 on heating

Answer: A



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2. A water sample has ppm level concentration of following anions

$$F^- = 10, SO_4^{2-} = 100, NO_3^- = 50$$

the anion/anions that make/makes the water sample unsuitable for drinking is/are

A. Only NO_3^-

B. Both SO_4^{2-} and NO_3^-

C. Only F^-

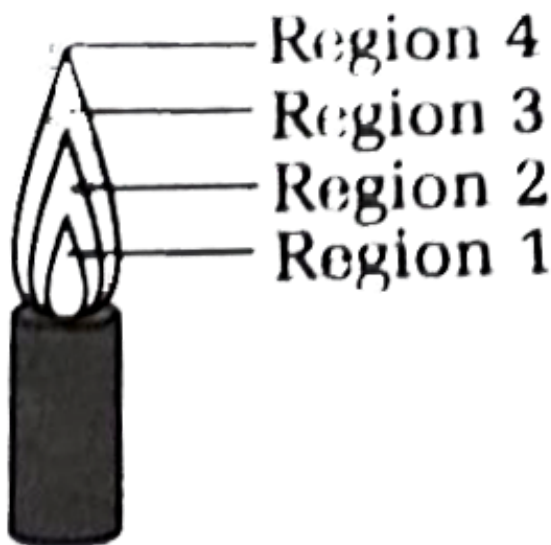
D. Only SO_4^{2-}

Answer: C



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3. The hottest region of Bunsen flame shown in the figure given below is



A. region 2

B. region 3

C. region 4

D. region 1

Answer: A



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4. Which one of the following statements about water is false ?

A. Water can act both as acid and as a base

B. There is extensive intramolecular hydrogen bonding in the condensed phase

C. Ice formed by heavy water sinks in normal water

D. Water is oxidised to oxygen during photosynthesis

Answer: B



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5. The concentration of fluoride, lead, nitrate and iron in a water sample from an underground lake was found to be 1000 ppb, 40 ppb, 100 ppm and 0.2 ppm, respectively. This water is unsuitable for drinking due to high concentration of

A. lead

B. nitrate

C. iron

D. fluoride

Answer: B



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6. The main oxides formed on combustion of Li, Na and K in excess of air respectively are

- A. LiO_2 , Na_2 and K_2O
- B. Li_2O_2 , Na_2O_2 and KO_2
- C. Li_2O , Na_2O_2 and KO_2
- D. Li_2O , Na_2O and KO_2

Answer: C



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7. Which of the following atoms has the highest first ionisation energy ?

A. Na

B. K

C. Sc

D. Rb

Answer: C



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8. Hydrogen peroxide in its reaction with KIO_4 and NH_2OH respectively, is acting as a

A. reducing agent, oxidising agent

B. reducing agent, reducing agent

C. oxidising agent, oxidising agent

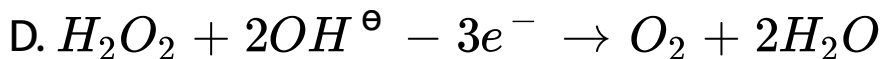
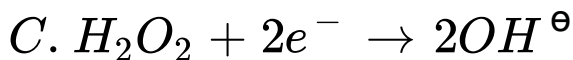
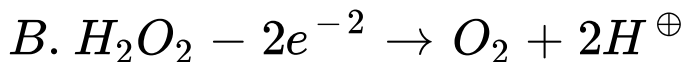
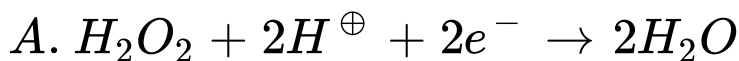
D. oxidising agent, reducing agent

Answer: A



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9. In which of the following reaction H_2O_2 acts as a reducing agents?



A. I and II

B. *III* and *IV*

C. *I* and *III*

D. *II* and *IV*

Answer: D



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10. A sodium salt of an unknown anion when treated with $MgCl_2$ gives white precipitate only on boiling. The anion is

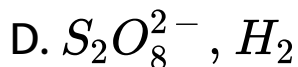
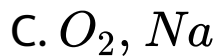
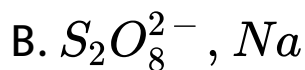
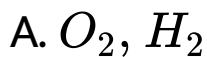


Answer: B



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11. A dilute aqueous solution of Na_2SO_4 is electrolyzed using platinum electrodes. The products at the anode and cathode are :



Answer: A



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12. Hydrolysis of one mole of peroxodisulphuric acid produces

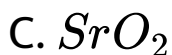
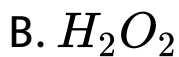
- A. two moles of sulphuric acid
- B. two moles of peroxomono sulphuric acid
- C. one mole of sulphuric acid and one mole of peroxomono sulphuric acid
- D. one mole of sulphuric acid, one mole of peroxomono sulphuric acid and one mole of hydrogen peroxide

Answer: C



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13. The species that do not contain peroxide ions, is



Answer: A



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14. The metallic luster exhibited by sodium is explained by

A. diffusion of sodium ions

B. oscillation of loose electron

C. excitation of free protons

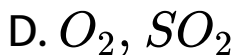
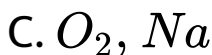
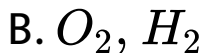
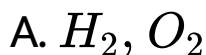
D. existence of body centred cubic lattice

Answer: B



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15. A solution of sodium sulphate in water is electrolysed using inert electrodes, The products at the cathode and anode are respectively.

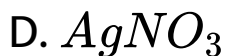
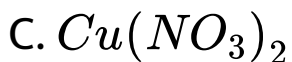
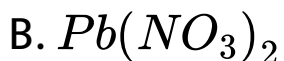


Answer: A



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16. Nitrogen dioxide cannot be obtained by heating

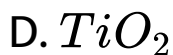
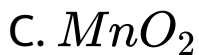
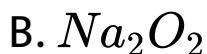


Answer: A



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17. The oxide that gives H_2O_2 on treatment with a dilute acid is



Answer: B



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18. The molecular formula of Glauber's salt is

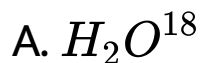


Answer: D

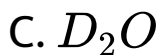


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19. Heavy water is



B. water obtained by repeated distillation



D. water at $4^\circ C$

Answer: C



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20. A solution of sodium metal in liquid ammonia is strongly reducing due to the presence of

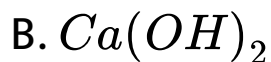
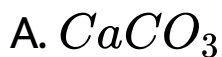
- A. sodium atoms
- B. sodium hydride
- C. sodium amide
- D. solvated electrons

Answer: D



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21. The temporary hardness of water due to calcium bicarbonate can be removed by adding



Answer: B



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22. The pair(s) of reagents that yield paramagnetic species is/are

A. Na and excess of NH_3

B. K and excess of O_2

C. Cu and dilute HNO_3

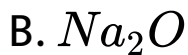
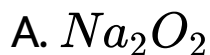
D. O_2 and 2-ethylanthraquinol

Answer: A::B::C



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23. The compounds(s) formed upon combustion of sodium metal in excess air is/are



Answer: A::B



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24. Sodium nitrate decomposes above- $800^{\circ}C$
to give



Answer: A::B::D



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25. A highly pure dilute solution of sodium in liquid ammonia:

- A. shows blue colour
- B. exhibits electrical conductivity
- C. produces sodium amide
- D. produces hydrogen gas

Answer: A::B



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26. When zeolite, which is hydrated sodium aluminium silicate, is treated with hard water, the sodium ions are are exchanged with

A. H^+ ions

B. SO_4^{2-} ions

C. Mg^{2+} ions

D. OH^- ions

Answer: A:D



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27. Sodium sulphate is soluble in water, whereas barium sulphate is sparingly soluble because

A. the hydration energy of sodium sulphate is more than its lattice energy

B. the lattice energy of barium sulphate is more than its hydration energy

C. the lattice energy has no role to play in solubility

D. the hydration energy of sodium sulphate
is less than its lattice energy

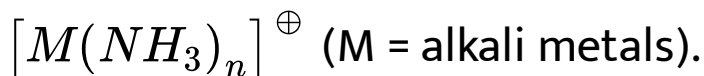
Answer: A::B



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28. Statement I: Alkali metals dissolve in liquid ammonia to give blue solutions.

Statement II: Alkali metals in liquid ammonia give solvated species of the type



A. Statement I is correct , Statement II is correct , Statement II is the correct explanation of Statement I

B. Statement I is correct , Statement II is correct , Statement II is not the correct explanation of Statement I

C. Statement I is correct , Statement II is incorrect

D. Statement I is incorrect , Statement II is correct

Answer: B



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29. Statement I $LiCl$ is predominantly a covalent compound.

Statement II Electronegativity difference between Li and Cl is too small

A. Statement I is correct , Statement II is correct , Statement II is the correct explanation of Statement I

B. Statement I is correct , Statement II is correct , Statement II is not the correct explanation of Statement I

C. Statement I is correct , Statement II is incorrect

D. Statement I is incorrect , Statement II is correct

Answer: C



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30. Assertion (A): Alkali metals can form ionic hydrides which contain hydride ion, H.

Reason (R): The alkali metals have low EN. Their hydrides conduct electricity, when fused and liberate hydrogen at the anode.

A. Statement I is correct , Statement II is correct , Statement II is the correct explanation of Statement I

B. Statement I is correct , Statement II is correct , Statement II is not the correct

explanation of Statement I

C. Statement I is correct , Statement II is
incorrect

D. Statement I is incorrect , Statement II is
correct

Answer: A



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31. Hydrogen gas is liberated the action of aluminium with concentrated solution of_____.



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32. Sodium gets dissolved in liquid ammonia because of _____ .

A. The adsorption of hydrogen by

palladium is commonly known as.....

B.

C.

D.

Answer: solvated electrons



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33. The adsorption of hydrogen by palladium is commonly known as _____.



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34. Iodine reacts with hot NaOH solution. The products are NaI and



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35. Sodium when burnt in excess of oxygen gives sodium oxide.



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36. A white solid is either Na_2O or Na_2O_2 . A piece of red litmus paper turns white when it is dipped into a freshly made aqueous solution of the white solid.

a. Identify the substance and explain the balanced equation.

b. Explain what would happen to the red litmus if the white solid were the other compound.



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37. Element (A) burns in nitrogen to give an ionic compound, (*B*) reacts with water to give (C) and (D). A solution of (C) becomes milky on bubbling carbon dioxide. Identify (A),(B),(C) and (D)

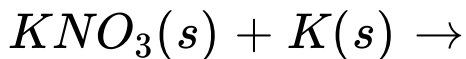


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38. Complete and balance the following chemical reactions:

anhydrous potassium nitrate is heated with

excess of metallic potassium.



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39. Give reasons for the following:

'Sodium carbonate is prepared by Solvay process but the same process is not extended to the manufacture of potassium carbonate'.



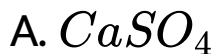
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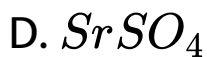
40. Water is a liquid, while H_2S is a gas at ordinary temperature. Explain.



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41. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy?



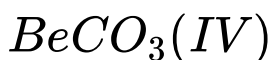
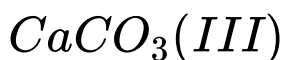


Answer: B



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42. The following compounds have been arranged in order of their increasing thermal stabilities . Identify the correct order .



A. $I < II < III < IV$

B. $IV < II < III < I$

C. $IV < II < I < III$

D. $II < IV < III < I$

Answer: B



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43. The oxidation states of the most electronegative elements in the products of the reaction between BaO_2 and H_2SO_4 are

A. 0 and -1

B. -1 and -2

C. -2 and 0

D. -2 and -1

Answer: D



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44. Calcium is obtained by the

A. electrolysis of molten $CaCl_2$

B. electrolysis of solution of $CaCl_2$ in
water

C. reduction of $CaCl_2$ with carbon

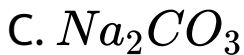
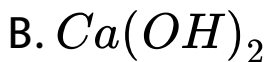
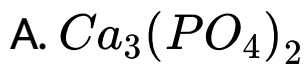
D. roasting of limestone

Answer: A



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45. The reagent(s) used for softening the temporary hardness of water is (are):

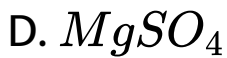
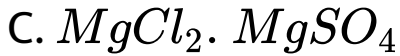
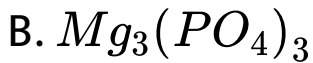


Answer: B::C::D



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46. $MgSO_4$ on reaction with Na_4OH and Na_2HPO_4 forms a white crystalline precipitate. What is its formula?



Answer: A



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47. The material used in solar cells contains

A. Cs

B. Si

C. Sn

D. Ti

Answer: B



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48. Give reasons for the following in one or two sentences only :

'' $BeCl_2$ can be easily hydrolysed.



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49. The crystalline salts of alkaline earth metals contain more water of crystallisation than the corresponding alkali metal salts. Why ?



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50. Arrange the following in increasing order of basic strength :

MgO, SrO, K₂O, NiO, Cs₂O



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Fill In The Blanks

1. Anhydrous $MgCl_2$ is obtained by heating the hydrated salt with



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True False

1. $MgCl_2 \cdot 6H_2O$ on heating gives anhydrous $MgCl_2$



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