



CHEMISTRY

BOOKS - NAGEEN CHEMISTRY (ENGLISH)

SELF ASSESSMENT PAPER 04

Questions

1. Fill in the blanks by choosing the appropriate word/words from those given in the brackets: [proton acceptor, pressures, non-spontaneous, proton donor, spontaneous, 3°, brown, red, 1°, temperatures, copper acetylide]

(i) According to Bronsted and Lowry, an acid is a _____

(ii) When ΔH is a negative and $T\Delta S$ is a positive, the process is _____

(iii) The +I effect of alkyl groups is in the order _____ > 2° > _____

(iv) When acetylene is treated with ammoniacal cuprous chloride a _____ precipitate of _____ is formed.

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2. Which of the following is not an arene?

A. A. Toluene

B. B. Phenol

C. C. Ethylbenzene

D. D. Cyclobuta-1,3diene

Answer:

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3. The element $Z = 114$ has been discovered recently. It will belong to which of the following family group and electronic configuration?

A. Halogen family, $[Rn]5f^{14}6d^{10}7s^27p^5$

B. Carbon family, $[Rn]5f^{14}6d^{10}7s^27p^2$

C. Oxygen family, $[Rn]5f^{14}6d^{10}7s^27p^4$

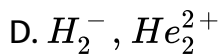
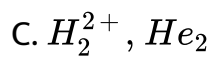
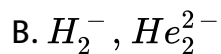
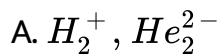
D. Nitrogen family, $[Rn]5f^{14}6d^{10}7s^27p^6$

Answer:



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4. In which of the following pairs of molecules/ions, both the species are not likely to exist?



Answer:

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5. 8.2 L of an ideal gas weights 9.0 g at 300 K and 1 atm pressure.

The molecular mass of the gas is

A. 54

B. 27

C. 13.5

D. 81

Answer:

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6. Match the following

- | | |
|----------------------------|---------------------------|
| (i) MnO_4^- | (a) Purification of water |
| (ii) Geometrical Isomerism | (b) good oxidizing agent |
| (iii) Alum | (c) CO_3^{2-} |
| (iv) HCO_3^- | (d) alkenes |

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7. Which of the following are not state functions ?

Temperature, entropy, heat, work, enthalpy, internal energy.

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8. Give the formula of one species positively charged and one negatively charged that will be isoelectronic with He.

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9. What is permutit method, how can it be used for softening hard water?

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10. What is the necessary and sufficient condition for a molecule to be optically active ?

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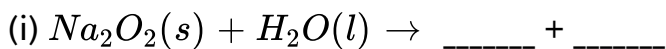
11. 0.76 g of a silver salt of a dibasic acid on ignition gave 0.54 g of silver. Calculate the molecular mass of the acid.

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12. 0.984 g of a chloroplatinate salt of a diacid base on ignition gave 0.39 g of platinum. Find the molecular mass of the base.

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13. Complete and balance the following equations:

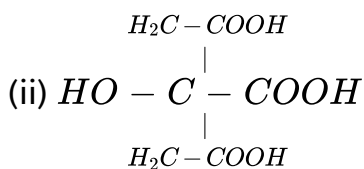
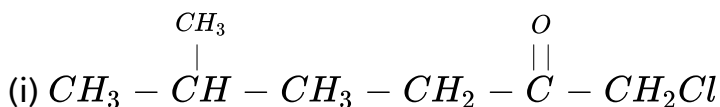


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14. A sample of nitric acid is 55 per cent by mass. Calculate the mass of nitric acid present in 100 cm of the sample if its density is 1.36gcm^{-3} .

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15. Write the IUPAC names of the following compounds:



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16. State as to why

(a) a solution of Na_2CO_3 is alkaline ?

(b) alkali metals are prepared by electrolysis of their fused

chlorides?

(c) sodium is found to be more useful than potassium ?

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17. An alkene 'A' on ozonolysis gives a mixture of ethanal and pentan-3-one. Write structure and IUPAC name of 'A'.

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18. What happens when an aqueous solution of potassium maleate is subjected to electrolysis

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19. If B-Cl bond has a dipole moment, explain why BCl_3 molecule has zero dipole moment.

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20. What is bond order? How is it related to bond length and bond dissociation energy?

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21. Name the types of hybridisation which lead to the following geometries

Tetrahedral

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22. 10.875 g of a mixture of NaCl and Na_2CO_3 was dissolved in water and the volume was made up to 250 mL. 20.0 mL of this solution required 75.5 mL of $\frac{N}{10} H_2SO_4$. Find out the percentage composition of the mixture.

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23. 4 g of O_2 and 2g of H_2 are confined in a vessel of capacity 1 litre at $0^\circ C$. Calculate the number of moles of each gas

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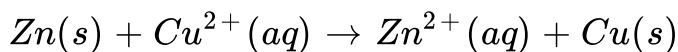
24. Give one reaction each to show that water can act as

- (i) an acid,
- (ii) abase,
- (iii) an oxidizing agent,



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25. Calculate the standard free energy change for the following reaction



$$\text{Given : } \Delta_f G^\circ [\text{Cu}^{2+}(aq)] = 65.0 \text{ kJ mol}^{-1}$$

$$\Delta_f G^\circ [\text{Zn}^{2+}(aq)] = -147.2 \text{ kJ mol}^{-1}$$



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26. Establish a relationship between ΔH and ΔU . Under what conditions is $\Delta H = \Delta U$?



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27. How is ozone formed in the stratosphere?



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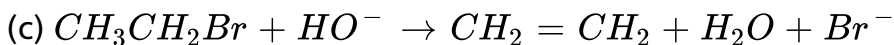
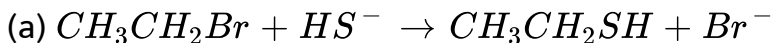
28. Select the correct answer :

Decrease of amount of ozone in stratosphere is called depletion of ozone and it is caused by

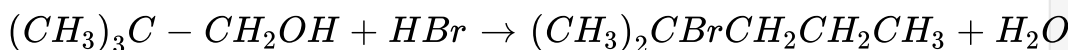


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29. Classify the following reactions in one of the reaction type studied in this unit.



(d)



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30. What is the relationship between the members of following pairs of structures? Are they structural or geometrical isomers or resonance contributors?



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31. Write the molecular orbital configurations of the following species:

(a) O_2^+ ions.

(b) O_2^- ions.

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32. Calculate their bond order N_2^-

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33. Predict their magnetic behaviour of N_2^+ .

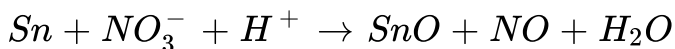
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34. Balance the following equations by oxidation number method.



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35. Balance the following equations by ion electron method.



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36. The dissociation constant of acetic acid is 1.8×10^{-5} at 298 K. Calculate its degree of dissociation and H_3O^+ ion concentration in its 0.1 M solution.

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37. Calculate the pH of 0.01 M Solution of CH_3COOH . The dissociation constant of the acid is 1.8×10^{-5}

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38. Describe the mechanism of dehydration of an alcohol in the presence of H_2SO_4

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39. What is Markownikoff's rule and how is it useful in predicting the addition of an unsymmetrical reagent to an unsymmetrical alkene? What is peroxide effect?



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