CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

SAMPLE PAPER 06 (SOLVED)

Part I

1. 1 g of an impure sample of magnesium carbonate (containing no thermally decomposable impurities) on complete thermal decomposition gave 0.44 g of

carbon dioxide gas.To percentage of impurity in the sample is..............

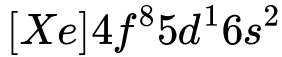A. 0

B. 4.4%

C. 0.16

D. 8.4%

Answer: c

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2. The electronic configuration of Eu (atomic no. 63) Gd (atomic no. 64) and To (atomic no. 65) are............

A. $[Xe]4f^65d^16s^2, [Xe]4f^75d^16s^2$ and

$[Xe]4f^85d^16s^2$

B. $[Xe]4f^7, 6s^2, [Xe]4f^75d^16s^2$ and $[Xe]4f^96s^2$

C. $[Xe]4f^7, 6s^2, [Xe]4f^86s^2$ and $[Xe]4f^85d^16s^2$

D. $[Xe]4f^65d^16s^2, [Xe]4f^75d^16s^2$ and $[Xe]4f^96s^2$

Answer: b

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3. Non-stoichiometric hydrides are formed by............

A. palladium,vanadium

B. carbon,nickel

C. manganese,lithium

D. nitrogen,chlorine

Answer: a

4. Which is the function of sodium-potasssium pump?

A. Maintenance of ion balance

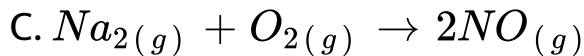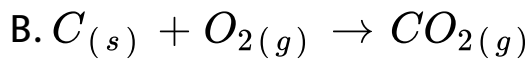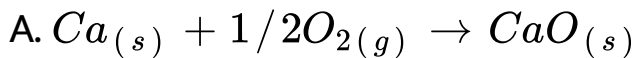B. Used in nerve impulse conduction

C. Transmitting nerve signals

D. Regulates the blood level

Answer: c

5. ΔS is expected to be maximum for the reaction..........

A. $Ca_{(s)} + 1/2O_{2(g)} \rightarrow CaO_{(s)}$

B. $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$

C. $Na_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)}$

D. $CaCO_{3(s)} \rightarrow CaO_{(s)} + CO_{2(g)}$

Answer: d

6. Which one of the following is a reversible reaction?

A. Ripening of a banana

B. Rusting of iron

C. Tarnishing of uilver

D. Transport of oxygen by Hemoglobin in our body

Answer: d

7. P_1 and P_2 are the vapour pressures of pure liquid components,1 and 2 respectively of an ideal binary solution if x_1 represents the mole fraction of component 1, the total pressure of the solution formed by 1 and 2 will be.............

A. $P_1 + x_1(P_2 - P_1)$

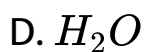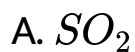B. $P_2 - x_1(P_2 + P_1)$

C. $P_1 - x_1(P_1 + P_2)$

D. $P_1 + x_2(P_1 + P_2)$

Answer: c

8. Which of the following molecule contain no π bond?

A. SO_2

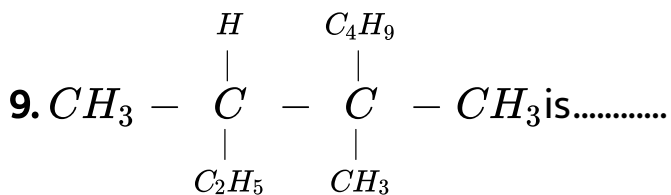B. NO_2

C. CO_2

D. H_2O

Answer: d

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9.

$$CH_3 - \underset{\underset{C_2H_5}{|}}{\overset{\overset{H}{|}}{C}} - \underset{\underset{CH_3}{|}}{\overset{\overset{C_4H_9}{|}}{C}} - CH_3 \text{ is.............}$$

A. 3,4,4-Trimethylheptane

B. 2-Ethyl-3,3-dimethyl heptane

C. 3,4,4-Trimethyloctane

D. 2-Butyl-2-methyl-3-ethyl-butanr.

Answer: c

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10. Which one of the following is an example for free radical initiators?

A. Benzyl peroxide
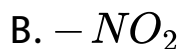
B. Benzyl alcohol

C. Benxyl acelate

D. Benzyldehyde.

Answer: a

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11. Some meta-directing substituents in aromatic substitution are given,Which one is most deactivating?

A. $-COOH$

B. $-NO_2$

C. $-C \equiv N$

D. $-SO_3H$

Answer: b

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12. Consider the following statements.

(i) S_{N2} reaction is a bimolecular nucleophilic first order reaction.

(ii) S_{N2} reaction take place in one step.

(iii) S_{N2} reaction involves the formation of a carbocation.Which of the above statements is/are not correct?

    A. (ii)

    B. (i) only

    C. (i) & (iii)

    D. (iii)

Answer: c

13. The questions given below consists of an assertion and the reason. Choose the correct option out of the choices given below each question.

Assertion (A): If BOD level of water in a reservoir is more than 5 ppm it is highly polluted.

Reason(R): High biological oxygen demand means high activity of bacteria in water

    A. Both (A) and R are correct and (R) is the correct explanation of (A)

B. Both (A) and R are correct and (R) is not the correct explanation of (A)

C. Both (A) and R are not correct

D. (A) is correct but(R) is not correct

Answer: d

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Part Ii

1. What is the actual configuration of copper (Z = 29)? Explain about its stability.

2. What is screening effect?

3. Ice is less dense than water at $0°C$. Justify this statement.

4. Aerosol cans carry clear warning of heating of the can. Why?

5. One mole of PCI_5 is heated in one litre closed container. If 0.6 mole of chlorine is found at equilibrium, calculate the value of equilibrium constant.

6. Why do gases always tend to be less soluble in liquids as the temperature is raised?

7. Give the general formula for the following classes of organic compounds.

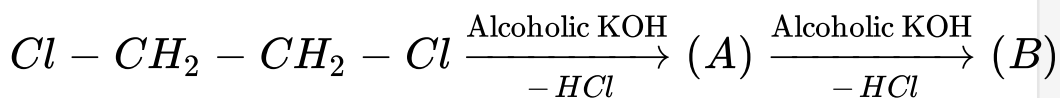(a) Aliphatic monohydric alcohol (b) Aliphatic ketones

(c) Aliphatic amines.

8. Identify which of the following shows +I and I effect?

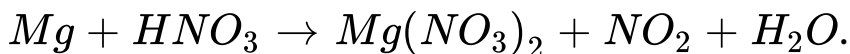(i) $-NO_2$ (ii) $-SO_3H$ (iii) -I (iv) -OH (1) CH_3O- (vi) CH_3-

9. Write the products A & B for the following reaction.

$$Cl - CH_2 - CH_2 - Cl \xrightarrow[-HCl]{\text{Alcoholic KOH}} (A) \xrightarrow[-HCl]{\text{Alcoholic KOH}} (B)$$

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Part Iii

1. Balance by oxidation number method:

$$Mg + HNO_3 \rightarrow Mg(NO_3)_2 + NO_2 + H_2O.$$

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2. For each of the following, give the sub level designation, the allowable m values and number of orbitals.

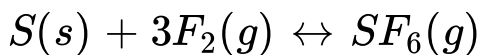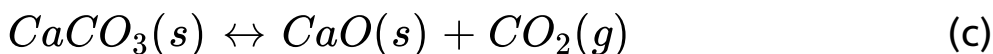**3.** Prove that ionization energy is a periodic property.

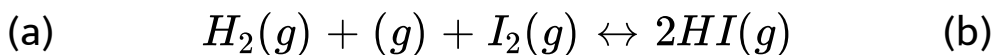**4.** Explain how heat absorbed at constant pressure is measured using coffee cup calorimeter with neat diagram.

5. Consider the following reactions,

(a) $\quad H_2(g) + (g) + I_2(g) \leftrightarrow 2HI(g)$ (b)

$CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$ (c)

$S(s) + 3F_2(g) \leftrightarrow SF_6(g)$

In each of the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

6. You are provided with a solid 'A'and three solutions of A dissolved in water-one saturated, one unsaturated, and one super saturated. How would you determine each solution.

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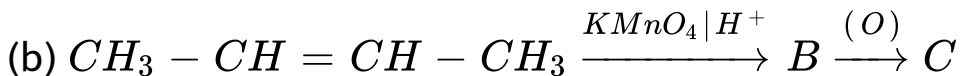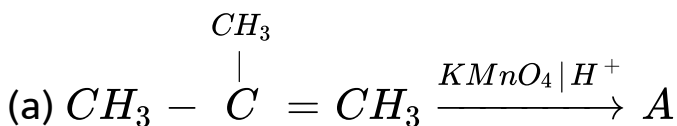**7.** Explain about the salient features of molecular orbital theory.

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8. Explain the types of addition reactions.

9. Complete the following reaction and identify A, B and C.

(a) $CH_3 - \overset{\overset{\displaystyle CH_3}{\displaystyle |}}{C} = CH_3 \xrightarrow{KMnO_4 \,|\, H^+} A$

(b) $CH_3 - CH = CH - CH_3 \xrightarrow{KMnO_4 \,|\, H^+} B \xrightarrow{(O)} C$

Part Iv

1. (i) How many radial nodes for 2s, 4p, 5d and 4f orbitals exhibit? How many angular nodes?

(ii) How many unpaired electrons are present in the ground state of

(a) $Cr^{3+} + (Z = 24)$ (b) Ne (Z = 10)

2. (i) The electronic configuration of an atom is one of the important factor which affects the value of ionization potential and electron gain enthalpy. Explain.

(ii) Explain why cation are smaller and anions are larger in radii than their parent atoms?

3. (i) Arrange NH_3H_2O and HF in the order of increasing magnitude of hydrogen bonding and explain the basis for your arrangement.

(ii) Can we use concentrated sulphuric acid and pure zinc in the preparation of dihydrogen?

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4. (i) Beryllium halides are covalent whereas magnesium halides are ionic. Why?

(ii) What happens when

1. Sodium metal is dropped in water?

2. Sodium metal is heated in free supply of air?

3. Sodium peroxide dissolves in water?

5. (i) Define Gibb's free energy.

(ii) You are given normal boiling points and standard enthalpies of vapourisation. Calculate the entropy of vapourisation of liquids listed below.

6. (i) Define mole fraction.

(ii) Differentiate between ideal solution and non-ideal solution.
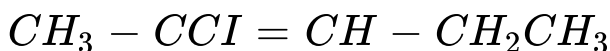
7. (i) What is dipole moment?

(ii) Describe Fajan's rule.

8. (i) How does Huckel rule help to decide the aromatic character of a compound?

(ii) Draw cis-trans isomers for the following compounds

(a) 2-chloro-2-butene (b)

$$CH_3 - CCI = CH - CH_2CH_3$$

9. (i) Reagents and the conditions used in the reactions are given below. Complete the table by writing down the product and the name of the reaction.

(ii) What is the IUPAC name of the insecticide DDT? Why is their use banned in most of the countries?

10. (i) Explain about green chemistry in day-to-day life.

(ii) How acetaldehyde is commercially prepared by

green chemistry?

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